# Retinopathy

## Targeted pan-retinal photocoagulation

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Diabetic maculopathy remains responsible for significant visual morbidity despite effective systematic screening and early detection. Most patients experience moderate rather than registrable visual impairment; however, this can still have a considerable impact on daily living.

There are a multitude of interlinked mechanisms underlying the development of diabetic eye changes. For some time there has been interest in the role of vascular endothelial growth factor (VEGF). Formerly known as vascular permeability factor, VEGF is known to be implicated in the breakdown of the blood–retinal barrier, leading to leakage of fats and fluid into the retina. Leakage in the central macula (Clinically Significant Macular Oedema [CSMO]) can lead to a drop in vision and usually requires treatment. Whilst conventional focal macular laser treatment is effective in stabilising the retinal changes, there has recently been a move towards using intravitreal anti-VEGF agents as these have been shown to be effective at restoring lost vision.

Peripheral ischaemia stimulates the production of VEGF and thus has a theoretical role in the development of CSMO and in the possible efficacy of anti-VEGF treatments.

Imaging of the retinal circulation using fluorescein dye has been possible for many years. Traditionally, fundus cameras with 30° or 50° field of view have been used to map both the central and the peripheral retina as the dye progresses through the retinal circulation. However, the advent of ultra-widefield imaging systems, or the use of traditional cameras with an ultra-widefield (Staurenghi) lens, means that up to 200° of the retina can be captured in each image, allowing much more accurate delineation of areas of peripheral capillary fallout.

Using ultra-widefield imaging, Wessel et al (2012; summarised alongside) were able to investigate the relationship between the presence of retinal ischaemia and the presence of CSMO. They found that eyes with retinal ischaemia were 3.75 times more likely to have CSMO than eyes without ischaemia. Additionally, as could be expected, they found that the proportion of ischaemia was significantly associated with the level of glycated haemoglobin. They were unable, however, to correlate the proportion of ischaemia with the extent of CSMO measured with optical coherence tomography.

The authors then went on to propose that the ability of ultra-widefield angiography to precisely identify areas of ischaemic retina could lead to a modification in the management of both proliferative diabetic retinopathy (PDR) and maculopathy. The use of fluorescein angiogram-directed retinal photocoagulation only in the ischaemic areas (targeted retinal photocoagulation) should reduce the production of VEGF and the drive to proliferation and leakage. This could prove a useful tool in the armoury of the treating ophthalmologist, obviating both the need to sacrifice well-perfused retina in people with PDR, and the need for monthly injections of anti-VEGF agents (with the associated risk of haemorrhage and infection) in people with CSMO. Clearly, more studies are required to further evaluate the technique.

**NB: In the previous issue's Retinopathy section, a commentary not written by the Section Editor was inadvertently published under her name. The intended commentary is published here, and the Editorial team apologises for this error.**

**RETINA**

## Retinal ischaemia is correlated with DMO in diabetic retinopathy

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| **Readability** | ✓✓✓✓ |
| **Applicability to practice** | ✓✓✓✓ |
| **WOW! factor** | ✓✓✓ |

1 Vascular endothelial growth factor (VEGF) is known to play a role in retinal ischaemia. Treatment of diabetic macular oedema (DMO) with anti-VEGF drugs has proved efficacious, suggesting that there is an association between DMO and retinal ischaemia.

2 The authors tested the hypothesis that retinal ischaemia increases the odds of having DMO in 70 treatment-naive people with diabetic retinopathy (DR; 122 eyes) who received ultra-widefield fluorescein angiography (UWFA) over a 2.5-year study period.

3 Optical coherence tomography (OCT) images were analysed to determine if retinal ischaemia extent was correlated with DMO severity.

4 Using medical records, people were initially divided into either the "DMO" (24 eyes) or the "no-DMO" (98 eyes) group. UWFA imaging yielded 76 eyes (62%) with some degree of ischaemia. DMO and retinal ischaemia were significantly correlated ($P<0.001$).

5 People with retinal ischaemia were 3.75 times more likely to have DMO compared to those without ischaemia (95% confidence interval, 1.26–11.13; $P<0.02$). No association between the amount of ischaemia and macular thickening was found.

6 The authors concluded that in treatment-naive people with DR, DMO is significantly correlated with retinal ischaemia. They added that UWFA is a useful tool in detecting retinal ischaemia, and could have significant implications for earlier DMO diagnosis, new treatment strategies and follow-up protocols.

Wessel MM, Aaker GD, Parlitsis G et al (2012) Ultra-wide-field angiography improves the detection and classification of diabetic retinopathy. *Retina* **32**: 78–91