

# Diabetic retinopathy seen in pre-diabetic patients

**Nadja Geipert  
in San Diego**

A LARGE clinical study has demonstrated that nearly eight percent of pre-diabetic patients exhibit evidence of mild, non-proliferative diabetic retinopathy and that retinopathy occurs very early in the course of Type 2 diabetes.

The study also found diabetic retinopathy in twelve percent of patients diagnosed with type 2 diabetes within a three year period. The study's results confirm previous observations that even newly diagnosed diabetes 2 patients need to be screened regularly.

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previously described as diabetic in the time course of diabetes," said David Nathan MD, professor of medicine at the Harvard Medical School in Boston and one of the study's investigators.

## **Diabetes Prevention Program study**

Researchers selected from the Diabetes Prevention Program (DPP) a cohort of 302 pre-diabetic patients and 588 patients who had developed type 2 diabetes an average of three years before retinal photographs were taken.

The DPP was an important clinical trial that investigated whether increased physical activity and dietary changes or treatment with oral medication could prevent diabetes in 3234 people with impaired glucose tolerance over the course of three

years. The trial indicated that losing seven percent of body weight and increasing activity levels would reduce the risk of developing type 2 diabetes by 58% and that the oral medication metformin could lower the risk by 31% (Knowler W et al; The New England Journal of Medicine; Feb 2002; 346).

The Research Group performed eye exams to look for microaneurysms and haemorrhages and discovered lesions typical of diabetes in 24 of the pre-diabetics and 70 of the diabetics.

## **Pre-diabetic retinopathy independent of blood sugar levels**

Although risk of developing these retinal changes was associated with chronic

glucose levels in the diabetic patients, they did not find a correlation between blood sugar levels and retinopathy in the pre-diabetic population. In diabetics, the incidence of retinopathy is known to be correlated to length of disease and serum glucose control, yet no such connection was found in the pre-diabetes population.

"That's a separate observation that we can take out of the study that's actually quite interesting," Dr Nathan, who chaired the DPP, said at the American Diabetes Association's 65th Annual Scientific sessions in San Diego, California.

But, the lack of connection between blood sugar and retinopathy might be due to the small case sample, according to Dr Nathan who wants to extend the study to all DPP participants.

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*Maria Karantza MD*

Other studies of diabetic patients have evaluated patients who had had the disease for an unknown duration, owing to the often late diagnosis of type 2 diabetes. The fact that 12.0% of new onset patients already had diabetic retinopathy raises new concerns.

"The relationship of retinopathy with chronic glycaemia shows that glucose control is very important even very early on in the development of diabetes," Dr Nathan stressed.

## **Guidelines for diabetes diagnosis may need review**

If the findings of retinopathy in the pre-diabetic population are confirmed in a larger population, then the standards for a diabetes diagnosis may need to be re-evaluated. Only eight years ago, an international panel of experts announced the lowering of blood sugar reading levels for a diabetes diagnosis from 140 mg of glucose per decilitre of blood plasma to 126 mg. The decision came after a plethora of research demonstrated that patients with blood glucose levels of 140 mg already exhibited complications such as retinopathy.

Currently, pre-diabetes, also sometimes called impaired fasting glucose or impaired glucose tolerance, is diagnosed when a patient has a blood sugar level above the normal range of 110 but below the diabetes range of 126, or when blood glucose levels are between 140 and 200 two hours after a glucose tolerance test.

The new study's results beg the question whether those levels already represent a problem for patients' eyes. But, in order to examine a threshold of glucose at which retinopathy will occur or to determine if more subtle changes in blood sugar have an effect on the development of diabetic retinopathy,

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research would need to look at a far greater number of retinopathy patients according to Dr Nathan. But, it's worth re-examining the issue, he said.

## **Gender protection**

A second study, also presented at the ADA's meeting, showed that teenage boys with Type 1 diabetes show an increase in the thickening of their artery walls, an early sign of cardiovascular disease.

The researchers compared the intimal-media thickness (IMT) of the common carotid artery in 90 teenage boys and girls with type 1 diabetes to 16 healthy controls of the same age using ultrasound. The boys with diabetes, the poorest glucose control, exposure to smoking and higher total cholesterol had a significantly higher IMT than the girls with diabetes, and the healthy controls.

"We think that there is a gender protection benefit in the girls, at least in the teenage years," said Maria Karantza MD, endocrinology fellow at Children's Hospital, Los Angeles and one of the study's investigators.

It might be more meaningful to treat certain risk factors like smoking, poor glucose control and high cholesterol early on in teenage boys with diabetes to prevent serious complications at a later age, according to Dr Karantza.

"For this reason, future research needs to look at how these risk factors correlate to other diabetes complications like eye disease and kidney disease. Is the child with increased thickening of the walls now at a greater risk to develop diabetic retinopathy in ten years?" she said.

**David Nathan MD**  
[dnathan@partners.org](mailto:dnathan@partners.org)

**Maria Karantza MD**  
[mkarantza@chla.usc.edu](mailto:mkarantza@chla.usc.edu)