

Retinopathy

Microvascular benefits of improved glycaemic control



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This paper presents results from a prospective study into the natural history of retinopathy in people with type 1 diabetes between 1990 and 2002. The prevalence and severity of diabetes complications over a period of 10 years

(duration of diabetes 4–14 years), is compared with results of previous studies – in particular the Wisconsin Epidemiologic Study of Diabetic Retinopathy (WESDR) which reported prevalence and risk factors in 1979/80.

The risk of development of retinopathy increased with duration and was strongly related to glycaemic control, especially at longer durations. The risk reduced with increased glucose monitoring, although this relationship was no longer significant on correction for HbA_{1c}. There was no relationship with blood pressure, body mass index or cigarette smoking, although it was thought these might contribute to risk at longer durations of diabetes.

Compared with the WESDR there has been a dramatic reduction in the prevalence and severity of retinopathy over the past 20 years. WESDR showed 74 % and 95 % prevalence of

diabetic retinopathy at 9–10 and 13–14 years respectively. The current study showed only 47 % and 73 %, respectively. At 14 years WESDR reported 35 % of people with moderate to severe nonproliferative retinopathy, compared with 10 % in this report; and the WESDR reported 25 % of participants with proliferative diabetic retinopathy, compared with only one individual in this study.

The authors of the current study attribute these differences to improved medical management of diabetes. In the WESDR only 12 % of people monitored blood glucose and mean HbA_{1c} was 10.1 %; in this study 66 % people conducted monitoring and mean HbA_{1c} was 9.0 %.

Although the prevalence of retinopathy was low in children under 10 years of age, on multivariate analysis the authors showed that overall risk was associated with duration and not modified by age.

This study importantly demonstrates the reduction in microvascular complications that can be achieved with improved medical management and especially glycaemic control in people with type 1 diabetes. Data from the WESDR has been widely used when planning screening services and in power calculations for interventional studies. Commissioners and researchers need to be aware of changing natural history when planning services and future studies.

AMERICAN JOURNAL OF EPIDEMIOLOGY



Lower prevalence of retinopathy seen than expected

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

1 The development of diabetic retinopathy in a population-based cohort of people with type 1 diabetes was examined to investigate the prevalence and severity of retinopathy and compared with previous US-based studies.

2 A total of 474 people with diabetes were followed from diagnosis for 4–14 years; retinopathy was determined by fundus photography at 4, 7, 9, and 14 years' duration.

3 The risk of developing retinopathy was modelled on demographic and diabetes-care characteristics using a generalised linear model.

4 Diabetes duration resulted in increased prevalence of retinopathy from 6 % at 4 years to 73 % at 14 years, and was highest among adults (≥20 years of age); risk of developing retinopathy rose with increasing duration, worse glycaemic control and age up to 20 years.

5 Indicators of diabetes care were related to retinopathy through their effect on glycaemic control.

6 Improvements in diabetes care leading to better glycaemic control could have contributed to the lower prevalence and less severe retinopathy seen than expected on the basis of a previous report from the same region.

LeCaire T, Palta M, Zhang H et al (2006) Lower-than-expected prevalence and severity of retinopathy in an incident cohort followed during the first 4–14 years of type 1 diabetes: the Wisconsin Diabetes Registry Study. *American Journal of Epidemiology* **164**: 143–50

JOURNAL OF OCULAR PHARMACOLOGY AND THERAPEUTICS

Effect of intravitreal triamcinolone acetonide

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

1 This study's purpose was to investigate the visual outcome of people receiving an intravitreal injection of triamcinolone acetonide (TA) to treat diffuse diabetic macular oedema. Of 40 eyes, 28 were randomised to treatment and 12 to placebo.

2 Visual acuity increased significantly in the study group, by 3.4 ± 2.5 Snellen lines ($P < 0.001$); it did not change significantly in the control group during follow-up.

3 At 3 months after baseline, 11 eyes and 10 eyes improved by at least 2 and 3 lines, respectively, versus 2 eyes and 1 eye in the control group.

4 At 6 months after baseline, 11 eyes and 9 eyes improved by at least 2 and 3 lines, respectively, versus no eyes for the control group.

5 A dose of 20 mg intravitreal TA temporarily increases visual acuity for 6 months after injection.

Jonas JB, Kampeter BA, Harder B et al (2006) Intravitreal triamcinolone acetonide for diabetic macular edema: a prospective, randomized study. *Journal of Ocular Pharmacology and Therapeutics* **22**: 200–7

JOURNAL OF
HYPERTENSIONRegular aspirin
use and retinal
microvascular signs

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

- 1 The cross-sectional and longitudinal association between aspirin use and retinal microvascular signs was examined.
- 2 Researchers digitised retinal photographs from participants of the Blue Mountains Eye Study cohort and measured average retinal arteriolar and venular diameters.
- 3 Regular aspirin users (weekly or daily) comprised 21.2% (n=775) of the baseline population.
- 4 At baseline and in people on one or more antihypertensive medications, regular aspirin use was associated with retinal arterioles on average 3.6 µm wider than those of occasional aspirin users or non-users.
- 5 Regular users of antihypertensive medications and aspirin had wider retinal arterioles at 5-year follow-up than those who used aspirin less often.

Liew G, Mitchell P, Leeder SR et al (2006) Regular aspirin use and retinal microvascular signs: the Blue Mountains Eye Study. *Journal of Hypertension* **24**: 1329–35

DIABETES CARE

Reduced visual
acuity is negatively
associated with QoL

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

- 1 The researchers aimed to establish quality of life (QoL) measures and utility values associated with visual acuity in type 2 diabetes.
- 2 The Medical Outcome Study Short Form with 36 items (SF-36) was given to 4051 people with type 2 diabetes who were enrolled in the Lipids In Diabetes Study and their best attainable vision was determined using an Early Treatment of Diabetic Retinopathy Study chart.
- 3 Eight domain scores and a utility value representing an overall QoL score were calculated.
- 4 All eight SF-36 domain scores were negatively related to reduced visual acuity.
- 5 Reduced visual acuity is negatively associated with QoL.

Clarke PM, Cull CA, Simon J, Holman RR (2006) Assessing the impact of visual acuity on quality of life in individuals with type 2 diabetes using the Short Form-36. *Diabetes Care* **29**: 1506–11

INVESTIGATIVE
OPHTHALMOLOGY &
VISUAL SCIENCEMicroperimetry of
value in predicting
outcome of oedema

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

- 1 This study of 61 eyes of 32 people with diabetes compared the changes in macular thickness and macular sensitivity with degrees of diabetic macular oedema.
- 2 Macular sensitivity, macular thickness and best corrected visual acuity were quantified, and lesion-related macular sensitivity and retinal fixation were investigated with a microperimeter; optical coherence tomography (OCT) quantified macular thickness.
- 3 The 61 eyes were graded by two retinal specialists: 16 eyes had no macular oedema (NO), 30 eyes had non-clinically significant macular oedema (NCSMO), and 15 eyes had clinically significant macular oedema (CSMO).
- 4 Macular thickness significantly increased from the NO to the CSMO group, but macular sensitivity significantly decreased from the NO to the CSMO group.
- 5 Between retinal sensitivity and normalised macular thickness a significant correlation coefficient was seen; linear regression analysis showed a decrease of 0.83 dB for every 10 % of deviation of retinal thickness from normal values.
- 6 Central macular sensitivity and visual acuity correlated significantly in the NCSMO group but not in the NO or in the CSMO groups.
- 7 Macular oedema could be more reliably documented by adding macular sensitivity mapping by microperimetry to macular thickness measurement by OCT and visual acuity determination.

Vujosevic S, Midena E, Pillotto E et al (2006) Diabetic macular edema: correlation between microperimetry and optical coherence tomography findings. *Investigative Ophthalmology and Visual Science* **47**: 3044–51

‘Regular users of antihypertensive medications and aspirin had wider retinal arterioles at 5-year follow-up than those who used aspirin less often.’

‘Macular oedema could be more reliably documented by adding macular sensitivity mapping by microperimetry to macular thickness measurement by optical coherence tomography and visual acuity determination.’

DIABETIC MEDICINE

Polaroid film as
effective as digital in
detecting retinopathy

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

- 1 The purpose of this study was to examine if the non-mydratic retinal camera (NMRC) using polaroid film is as effective as the NMRC using digital imaging in detecting mild retinopathy in Australia.
- 2 People with diabetes had single-field non-mydratic fundus photographs taken using a digital and then a polaroid film camera.
- 3 Dilated 30° seven-field stereo photographs were taken of each eye as the gold standard and graded in a masked fashion.
- 4 A total of 196 participants gave 325 undilated retinal photographs (57 % were males and the mean age was 68.8 years); there were 298 eyes with all three sets of photographs from 154 people.
- 5 The polaroid NMRC had a sensitivity of 84.1 % and the digital NMRC had a sensitivity of 86.2 %.
- 6 The specificities of the cameras were both 71.2 %, and there was no difference in their abilities to detect mild referral retinopathy, as defined in Australia.

Phiri R, Keffe JE, Harper CA, Taylor HR (2006) Comparative study of the polaroid and digital non-mydratic cameras in the detection of referable diabetic retinopathy in Australia. *Diabetic Medicine* **23**: 867–72