Retinopathy

Better management of maculopathy may reduce the prevalence of blindness in people with type 1 diabetes

Deborah Broadbent, Director of Diabetic Eye Screening, Royal Liverpool University Hospital

In 2009, the World Health Organization (WHO) estimated that there were 314 million visually impaired people in the world, of whom 45 million were blind (WHO, 2009). Diabetic retinopathy is one of the leading causes of visual impairment, particularly in people of working age, in the industrialised world (WHO, 2009). However, little data is available on the rates of blindness due to diabetic retinopathy.

In Fyn County, Denmark, in 1973, 727 individuals with type 1 diabetes were identified, and subsequently called for a baseline examination in 1981. Visual acuity was recorded along with retinopathy grading and risk-factor data (Grauslund et al, 2009; summarised alongside). Mortality and blindness data were then collected in 2006/7: 4.2% of people were already registered blind at baseline, and in the follow-up period a further 7.5% became blind. Unfortunately, the cause of blindness was only available in 30 people, but in 29 this was attributed to diabetic retinopathy. The median age at registration was 45.0 years for men and 53.8 years for women, with women also having a longer duration of diabetes at the time of registration than men.

Individuals registered blind during follow-up had a higher mortality than those who were not, confirming previous studies. The mortality adjusted incidence of blindness was found to be 4.11 per 1000 person years, with no statistical difference between men and women. Maculopathy, level of retinopathy and HbA_{1c} level at baseline were found to be predictors of blindness. Of those individuals with maculopathy, 16.3% developed blindness compared with 5.5% without maculopathy, and the risk of blindness was 69% higher for each 1% rise in HbA_{1c} level. The authors concluded that despite advances in management of diabetic eye disease, and presumably in medical management of diabetes, blindness in people with type 1 diabetes remains a concern.

> *"Over the past 25 years our understanding of diabetes and diabetic retinopathy has increased exponentially and with this has come major changes in management of individuals with diabetes."*

Progression to blindness takes many years. Long-term data on the incidence of blindness is, therefore, difficult to collect and to analyse. Over the past 25 years our understanding of diabetes and diabetic retinopathy has increased exponentially and with this has come major changes in management of individuals with diabetes. Timely ascertainment of onset of diabetes and good control can modulate the course of the disease and its complications. It is proposed that early detection (screening) and timely treatment of diabetic retinopathy can reduce blindness – but is this true in practice? The treatment of maculopathy remains a challenge and this would now appear to be the key factor in further reducing blindness.

World Health Organization (2009) *Magnitude and Causes of Visual Impairment*. Fact Sheet No 282. WHO, Geneva

OPHTHALMOLOGY

Blindness is common in T1D and may increase mortality

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

1 This retrospective cohort study was undertaken to evaluate the long-term incidence of blindness among individuals with type 1 diabetes, and to determine the risk factors for blindness.

2 The authors studied 573 people who developed type 1 diabetes before the age of 30 years in Denmark. These individuals had undergone an examination for visual acuity, retinopathy, maculopathy, HbA_{1c}, proteinuria, blood pressure and smoking between 1981 and 1982, and were followed up for 25 years.

3 Individuals who became members of the Danish Association for the Blind (DAB) at any time between baseline and study end were defined as being blind. The DAB is open to any individual with a best-corrected visual acuity in the better eye of <6/60 or complications leading to this.

4 The results showed that the 25-year cumulative incidence of blindness was 8.0% in men and 6.8% in women with diabetes. When adjusted for mortality this increases to 9.5%, with a rate of 4.1 per 1000 person years.

5 Both maculopathy and HbA_{1c} at baseline were related to development of blindness, with an odds ratio of 1.69 for every 1% increase in HbA_{1c} level. Maculopathy associated with non-proliferative retinopathy and proliferative retinopathy gave odds ratios of 6.18 and 8.16, respectively.

6 Mortality was significantly higher in individuals who developed blindness (P=0.02), and the authors concluded that glycaemic control and maculopathy are important risk factors in the development of blindness in T1D.

Grauslund J, Green A, Sjølie AK (2009) Blindness in a 25-year follow-up of a population-based cohort of Danish type 1 diabetic patients. *Ophthalmology* **116**: 2170–4

DIABETES RESEARCH & CLINICAL PRACTICE

CSMO is influenced by ethnicity

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

1 This study was undertaken as part of the Veterans Affairs Diabetes Trial (VADT) to determine the risk factors associated with clinically significant macular oedema (CSMO), and whether it is influenced by ethnicity.

2 At baseline in the VADT, seven-field fundus photography identified the presence of CSMO in 127 (10%) of 1268 individuals with T2D.

3 During the analysis it was established that CSMO was present in 18% of Hispanics, 15.6% in African-Americans and 6.3% in non-Hispanic white individuals ($P<0.01$).

4 CSMO was significantly ($P<0.01$) associated with younger age, earlier onset of diabetes, severity of retinopathy, high HbA_{1c}, high blood pressure, high levels of albuminuria and presence of an amputation using univariate analysis.

5 Following multivariate regression, the authors concluded that CSMO was associated with ethnicity, diastolic blood pressure, retinopathy and amputation.

Emanuele N, Moritz T, Klein R et al (2009) Ethnicity, race, and clinically significant macular edema in the Veterans Affairs Diabetes Trial (VADT). *Diabetes Res Clin Pract* **86**: 104–10

OPHTHALMOLOGY

Reduced risk of visual impairment since the 1980s

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

1 This study was undertaken to investigate the relationship between the period of diagnosis of type 1 diabetes and the prevalence of visual impairment.

2 The eyes of 955 people were examined five times in the following periods: 1980–1982, 1984–1986, 1990–1992, 1995 –1996, and 2005–2007.

3 Visual impairment was defined as best-corrected visual acuity in the better eye of 20/40 or worse.

4 There was a lower prevalence of visual impairment for more recent periods of diagnosis of diabetes ($P<0.001$).

5 The authors suggest that the lower prevalence is down to more emphasis on good glycaemic control in more recent years.

Klein R, Lee KE, Knudtson MD et al (2009) Changes in visual impairment prevalence by period of diagnosis of diabetes: the Wisconsin Epidemiologic Study of Diabetic Retinopathy. *Ophthalmology* **116**: 1937–42

RETINA

Photocoagulation improves diabetic macular oedema

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

1 The authors carried out this study to ascertain whether eyes with macular oedema (DMO) treated with focal/grid photocoagulation, with a reduction in central subfield thickness (CST) measured with optical coherence tomography after 16 weeks, would continue to improve if re-treatment was deferred.

2 Of the 115 eyes that completed the study, 47% had a decrease in CST by ≥10%; 48% of these had a CST ≤250 µm at 16 weeks; the rest had a further decrease in CST ≥10% from 16–32 weeks without further treatment.

3 Sixteen weeks after focal/grid photocoagulation for DMO in eyes with a definite reduction in central oedema, 23–63% will continue to improve without additional treatment.

Browning DJ, Miller KM, Aiello LP et al (2009) The course of response to focal/grid photocoagulation for diabetic macular edema. *Retina* **29**: 1436–43

DIABETIC MEDICINE

Reduced risk of developing sight-threatening retinopathy over 17 years of screening

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

1 This article describes the results of a screening programme predominantly in people with T2D in the UK, with reference to sight-threatening diabetic retinopathy (STDR) prevalence and risk profile, and the effects of varied screening intervals on the development of STDR.

2 The authors examined the records of 20788 individuals with diabetes, managed in general practice, and screened between 1990 and 2006, with up to 17 years' follow-up and up to 14 screen episodes each.

3 In 63 622 screening episodes, 16 094 (25%) were classified with any retinopathy, 3136 (4.9%) with referrable retinopathy and 384 (0.60%) with STDR (defined as proliferative retinopathy and/or maculopathy).

4 The prevalence of screening-detected STDR decreased by 91% between 1991 and 2006. The prevalence of referable retinopathy increased from 2.0% in 1991–1993 to 6.7% in 1998–2001, then decreased to 4.7% in 2006.

5 Compared with screening intervals of 12–18 months, screening intervals of 18–24 months were not associated with increased risk of retinopathy but intervals of longer than 24 months were associated with increased risk. Referrable retinopathy was 60% more likely if the screen interval was over 24 months.

6 The authors concluded that a screen interval of 2 years is safe for low risk patients, i.e. those with no diabetic retinopathy at their initial screen.

Misra A et al (2009) Trends in yield and effects of screening intervals during 17 years of a large UK community-based diabetic retinopathy screening programme. *Diabet Med* **26**: 1040–7

"Clinically significant macular oedema was significantly associated with younger age, earlier onset of diabetes, severity of retinopathy, high HbA1c, high blood pressure, high levels of albuminuria and presence of an amputation."