Ophthalmology Update

Richmond Eye Associates, P.C.

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In the Next Issue of *Ophthalmology Update:*

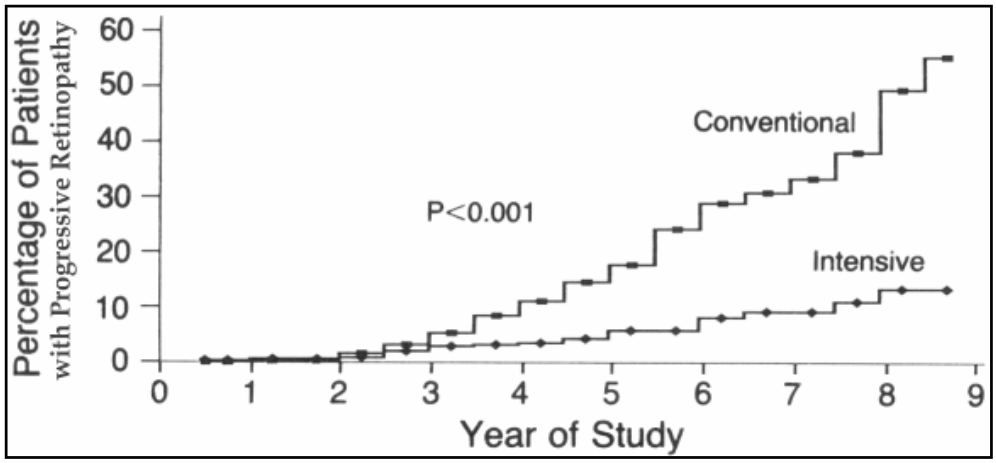
- **Fact and fiction regarding nutrition, nutritional supplements, and alternative herbal agents in eye health and disease.**
- **Recommended preventive strategies for retinal disorders.**

Ophthalmic Topics of Interest to the Medical Physician

Update on Retinal Complications of Diabetes Mellitus

The Diabetes Control and Complication Trial (DCCT)

This study of the Diabetes Control and Complications Trial Research Group (DCCT) was a prospective, randomized trial involving over 1400 patients with insulin dependent diabetes (Type I). The objective of the study was to determine the beneficial effect of "intensive" control of diabetes compared to "conventional" control. As shown in the graph below, the benefits of intensive control were found to be exceptional, reducing the progression of diabetic retinopathy to a cumulative 8.5 year rate of 11.5%, vs. 54.1% in the conventionally treated group. This group of patients had no retinopathy at the outset of the study.



This graph shows the remarkable benefit of intensive diabetes control on progression of diabetic retinopathy over time – from the DCCT.

Continued on page 4 . . .

64% Incidence of Retinopathy in African Americans with IDDM

An alarmingly high rate of diabetic retinopathy was found in a recent study (Jan. 2000) of African Americans with insulin dependent diabetes (Type I). The study looked at 725 African Americans in New Jersey identified as having IDDM, and eye examinations as well as blood pressure measurements and blood glucose levels were determined. Ages ranged from 0.1 to 62 years.

Overall, nearly 2/3 of the patients, or 64% had some retinopathy at the time of the examination. The frequency and severity of the retinopathy were significantly associated with the age at exami-

Continued on page 3 . . .

Diabetes and Hypertension Control in Type II Diabetes Beneficial

The United Kingdom Prospective Diabetes Study (UKPDS) involved over 4000 patients (mean age 54 years) from 1977 to 1997 with newly diagnosed Type 2 diabetes mellitus. Previously, no large studies had found evidence that improved glucose control in Type 2 diabetics would reduce microvascular complications (such as diabetic retinopathy). Two questions asked by this study were:

- Would tightly controlled blood glucose reduce the risk of macro- or microvascular complications in Type 2 diabetes?
- Would tight control of blood pressure (hypertension) help to prevent vascular complications?

In this study, "intensive" control of diabetes aimed for a fasting blood glucose of less than 6 mmol/L, and a pre-meal glucose ranging from 4 – 7 mmol/L. A dietician counseled patients. Oral medications (sulfonylureas) and/or insulin was used. "Conventional" control of diabetes aimed to control blood sugar using diet alone as well as possible. If hyperglycemia developed, or if the fasting blood glucose exceeded 15 mmol/L, then medications were added.

The intensively treated group maintained an average HbA1c 11% lower than the conventional group (7% vs. 7.9%). The intensively treated group had higher rates of hypoglycemia and increased weight gain.

- The intensively treated group had a 26% reduction in microvascular complications (such as retinopathy and nephropathy). There was found to be no advantage between the use of insulin or sulfonylureas.
- Intensive control of glucose alone did not improve the cardiovascular risk, or of the risk of stroke.

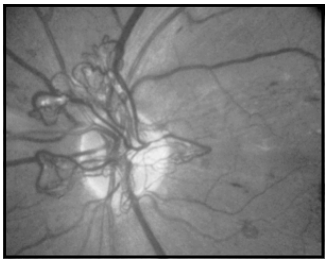
Tight hypertensive control aimed for a blood pressure of less than 150/85. The benefit of hypertensive control was evaluated in the intensively controlled diabetes group:

- The average blood pressure in the intensively treated group was 144/82, compared with 154/87.
- The group with intensively controlled blood glucose and blood pressure showed a 37% reduction in eye and kidney damage, and a significant reduction in the need for retinal photocoagulation.
- There was a 34% reduction in the risk of deterioration of retinopathy with both diabetes and hypertension tightly controlled, and a 47% reduction in the risk of losing 3 lines of vision related to retinopathy.

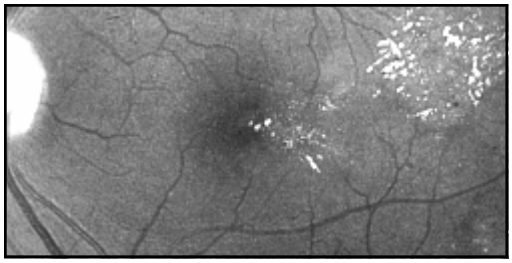
(From Lancet 1998; 352:837-853, UK Prospective Diabetes Study Group, and from The British Medical Journal 1998; 317:703-713, UK Prospective Diabetes Study Group).

Clinical Pearl: Retinal Findings Worth Looking for in Diabetes

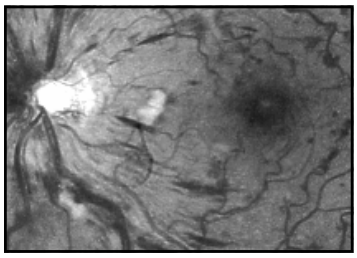
Fundoscopic examination in diabetic patients is important, but often difficult. Even when annual examinations by an ophthalmologist are performed, additional examinations by the primary care physician can indicate if a more urgent follow-up is needed. Direct ophthalmoscopy in diabetics is often complicated by small pupils and cataract. If the fundus can be visualized, special . . .



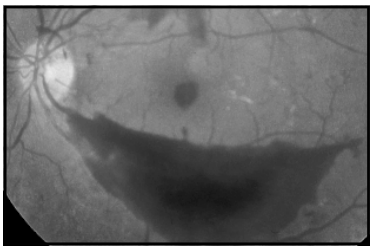
Disc Neovascularization: Proliferative Retinopathy



Diabetic Macular Edema: exudate near fovea, or rings of exudate are worrisome.



Extensive Retinopathy: may indicate transition to prolifera-



Pre-retinal or Vitreous hemorrhages usually indicate proliferative disease.

. . . attention given to the optic nerve and macula can reveal worsening retinopathy, such as the development of macular edema or proliferative retinopathy, which may indicate the need for photocoagulation. If a patient who previously only had background retinopathy now presents with a retinal appearance such as those shown, prompt ophthalmic referral should be made.

Diabetic (Type I) Retinopathy in African Americans (con't from page 1)

nation and with the duration of diabetes. Glycemic control, as evaluated by glycosylated hemoglobin levels, was poor. Only 10.2% of patients had values with the "normal" range of 4% to 8%. 35.8% of patients had values of at least 15%. 61% of patients followed a specific diet no more than half of the time, and most rarely adjusted their insulin dosage.

Retinopathy worsened with age:

- At age 15 – 19, 6.3% had at least moderate retinopathy. 7.6% of those under 18 were visually impaired (20/40 or worse vision).
- At age 20 – 29, 22.8% had at least moderate retinopathy, and 11.4% had proliferative retinopathy.
- At age 30 – 44, 48.9% had at least moderate retinopathy.
- At age 45 and older, 69% had at least moderate retinopathy, 93% had some evidence of retinopathy, and 59% had proliferative retinopathy. 32.8% had visual impairment, and 14.8% were legally blind (vision 20/200 or worse).

Overall, diabetic retinopathy was responsible for 62% of the cases of visual impairment, and 90% of cases of legal blindness. Other causes of visual impairment included glaucoma, cataract, and other retinal diseases. Women were found to have a higher frequency of visual impairment.

Other risk factors for African Americans with IDDM:

- Patients with the worst HbA1c levels (highest quartile), were on average three times as likely to have any retinopathy as those in the lowest quartile.
- Systemic hypertension was found in 34.3% of patients, and hypertensive patients were found to be four times as likely to have proliferative retinopathy as those without.
- Renal disease was found in 50% of patients, and 9.2% were undergoing dialysis. Among those with renal disease, 84.1% had some retinopathy, and 35% had proliferative retinopathy.
- There was found to be no association between socioeconomic status and the frequency of diabetic retinopathy.

(From Diabetic Retinopathy in African Americans with Type I Diabetes: The New Jersey 725, Parts I and II. Archives of Ophthalmology Jan. 2000; 118:97-104 and 105-115, Roy, Monique S., M.D.)

Association of Ocular Disease and Mortality in a Diabetic Population

This study examined the association of diabetic retinopathy and other eye conditions with cause-specific and any-cause mortality in a large population based study (the Wisconsin Epidemiologic Study of Diabetic Retinopathy WESDR). Participants were either younger onset diabetics (less than 30 years of age at diagnosis and using insulin, #996 participants) or older onset diabetics (diagnosed with diabetes at age 30 or older, #1370 participants). Participants were followed for 16 years, starting with baseline eye examinations between 1980 and 1982.

After controlling for age and sex, strong statistically significant associations were found between most of the ocular conditions studied and stroke mortality, ischemic heart disease mortality, and any-cause mortality. Especially, severe retinopathy or visual impairment at baseline indicated a greatly increased risk of death within 16 years:

- In the group of younger diabetics, the prevalence and severity of retinopathy were higher than in the older onset group. There were 21.5% confirmed deaths within 16 years. Visual impairment at baseline (due to any cause) and retinopathy at baseline were associated with higher risks of mortality (after controlling for age and sex).
- In the older onset group, confirmed mortality within 16 years was 72.7%. Visual impairment, cataract, and glaucoma were more frequent in this group (average age 66.6 years.) After controlling for age and sex, retinopathy severity at baseline was associated with mortality from any cause, and the presence of proliferative retinopathy with stroke mortality. Visual impairment at baseline was associated with ischemic heart disease and stroke mortality.

"Impaired visual acuity and severe retinopathy in diabetics may indicate increased mortality risk from heart disease and stroke."

- In the older group, cataract, cataract extraction, and glaucoma at baseline were not associated with mortality, nor was any ocular condition with cancer mortality.

(From Archives of Ophthalmology, 1999; 117:1487-1495, Klein R, MD, et al.)

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WWW.RICHMONDEYE.COM

- Extensive patient information, including discussion of over 80 eye conditions and a section discussing risks and benefits of laser vision correction.
- Physician section with topics of interest, including a diabetes section.
- Office locations and information.

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Ophthalmology Update
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Benefits of Intensive Glucose Control (con't from page 1)

In the DCCT, "intensive" treatment of Type I diabetes consisted of the following:

- Three or more injections of insulin daily, or the use of an external pump, guided by self-monitored blood glucose levels checked four times daily.
- The goal of treatment was normoglycemia, with before meal glucose levels between 70 and 120, and a monthly glycosylated glucose level (HbA1c) within the normal range (< 6.05%).

"Conventional" treatment of diabetes consisted of:

- One or two insulin injections daily, with daily monitoring of urine and blood glucose, and modifications in diet and exercise.
- The goal of treatment was freedom from symptoms of hyper- and hypoglycemia, with normal growth and development of an ideal body weight.

The intensively treated group was able to maintain a significant reduction in HbA1c throughout the study, ranging from 6.5% to 7.9%, with 44% achieving an HbA1c of less than 6.05% at least once during the study. The conventionally treated group's HbA1c ranged from 7.8% to 10.2%, with less than 5% being 6.05% or better. The intensively treated group had a three-fold increase in episodes of hypoglycemia.

Other Ocular Benefits: Overall, those in the intensively treated group demonstrated a 78.5% reduction in risk for worsening retinopathy in those with no retinopathy at the start of the study, and a 64.5% reduction in risk in those with mild retinopathy at the outset.

Those in the intensively treated group had a 9 year rate of only 8% and 15% for proliferative retinopathy and diabetic macular edema respectively, compared to 25% and 27% in the conventionally treated group.

Early Worsening: A phenomenon referred to as "early worsening" was observed in the intensively treated group during the first one to two years of a changeover to markedly improved glucose control. During this period, a temporary worsening in retinopathy occurred, before the benefits of improved glycemic control were realized. It was recommended that patients making the transition to intensive control be monitored by their ophthalmologist more frequently during this time period.

(From Archives of Ophthalmology, 1995;113:36-51, The Diabetes Control and Complication Trial Research Group.)