

# Blood Pressure Control Can Reduce Risk of Diabetic Retinopathy

The UKPDS 69 determined the relationship between tight blood pressure control and the different aspects of DR among patients with type 2 diabetes.

REVIEWED BY DAVID R. MATTHEWS, FRCP

**T**ight blood pressure (BP) control can reduce the risk of diabetic retinopathy, according to the results of the United Kingdom Prospective Diabetes Study (UKPDS) 69.<sup>1</sup>

David R. Matthews, FRCP, and colleagues, reporting in the *Archives of Ophthalmology*, said that by age 40 about 32% of patients with type 2 diabetes are hypertensive. By the age of 60 years, this increases to about 47%. Matthews, from the Churchill Hospital in Oxford, England, and researchers from the UKPDS Group wrote, "Hypertension increases the risk for the development of microvascular disease and the UKPDS has documented both the prevalence and the extent to which intervention to reduce BP reduced the incidence of microvascular endpoints."

## FOUR-FIELD PHOTOGRAPHY

The randomized, controlled clinical trial was carried out in 19 hospital-based clinics in England, Scotland and Northern Ireland. Researchers used four-field retinal photography to assess the outcome of retinopathy status for tight BP control. The tight BP control goal group had a goal pressure of <150/85 mm/Hg and that was compared to a less tight group with a goal of <180/105 mm/Hg.

A total of 1,148 patients with type 2 diabetes were studied. Patients had a mean age of 52 years and had had diabetes for a mean of 2.6 years at the start of the investigation and a mean BP of 160/94 mm/Hg. A total of 758 patients were assigned to the tight control group with an angiotensin converting enzyme (ACE) inhibitor or a beta-blocker as the main therapy.

Deterioration of retinopathy was determined by a 2 step change on a modified Early Treatment Diabetic Retinopathy Study (ETDRS) final scale; endpoints such as photocoagulation, vitreous hemorrhage and cataract

extraction; and analysis of specific lesions such as microaneurysms, hard exudates and cotton-wool spots were used. Dr. Matthews and colleagues assessed visual acuity at 3-year intervals using the ETDRS logarithm, and blindness was monitored as an endpoint with a criterion of Snellen 6/60 or worse.

At 4.5 years following randomization, 23.3% of patients in the tight BP control group and 33.5% of patients in the less tight group had  $\geq 5$  microaneurysms (relative risk [RR], 0.70;  $P=.003$ ). "The effect continued to 7.5 years (RR, 0.66;  $P<.001$ ). Hard exudates increased from a prevalence of 11.2% to 18.3% at 7.5 years after randomization with fewer lesions found in the tight BP control group (RR, 0.53;  $P<.001$ )," Dr. Matthews said.

Cotton-wool spots increased in both groups but less so in the tight BP control group, which had fewer at 7.5 years (RR, 0.53;  $P<.001$ ), the researchers found. At 4.5 years, a 2-step or more deterioration on the ETDRS scale with fewer patients in the tight BP control group progressing 2 steps or more (RR, 0.75;  $P=.02$ ). The investigators found that patients assigned to the tight control group were less likely to undergo photocoagulation, (RR 0.65,  $P=.03$ ) the difference driven by photocoagulation due to maculopathy (RR, 0.58;  $P=.02$ ).

Dr. Matthews and colleagues reported that the cumulative incidence of the endpoint of blindness (Snellen visual acuity  $\geq 6/60$ ) in one eye was 18/758 for the tight BP control group versus 12/390 for the less tight BP control group. "These equate to absolute risks of 3.1 to 4.1 per 1,000 patient-years, respectively ( $P=.046$ ; RR, 0.76; 99% CI, 0.29-1.00).

There was also no detectable difference in outcomes between the patients assigned ACE inhibitors and those assigned beta-blockers.

## VISUAL IMPAIRMENT PREVALENT AMONG PATIENTS WITH DIABETES AGED 50 YEARS AND OLDER

By Conni Bergmann Koury, Editor-In-Chief

In 2002, among diabetic people aged 50 years and older, the age-adjusted prevalence of visual impairment was 23.5% compared with 12.4% for those without diabetes.

Researchers from the Centers for Disease Control and Prevention (CDC) reported that, because there is a substantially higher prevalence of visual impairment among those with diabetes, measures are needed to increase comprehensive eye examinations.

According to the CDC, visual impairment and blindness affect an estimated 3.4 million adults in the United States aged  $\geq 40$  years. The leading causes of visual impairment and blindness are diabetic retinopathy and age-related eye diseases. About 18 million adults in this country have diabetes – of whom an estimated 30% are undiagnosed, according to CDC researchers.

In order to identify and characterize the prevalence of visual impairment and selected eye disease among people aged  $\geq 50$  years with and without diabetes, researchers analyzed data from the 2002 National Health Interview Survey. Logistic regression analysis was used to assess the association between diabetes status and prevalence of visual impairment or selected eye diseases while adjusting for demographic characteristics.

The researchers found that the age-adjusted prevalence of diabetic retinopathy among people aged  $\geq 50$  years was 10.2%. The age-adjusted prevalence for cataracts among those with and without diabetes was 31.8% and 21.2%, respectively; for glaucoma, 8% and 4.3%; and for macular degeneration, 2.8% and 2.9%.

Among people with diabetes, visual impairment was higher among women than men and higher among those with less than a high school education than among those with a high school education or more.

According to the CDC, it has made progress in vision health for people with diabetes. Increasing comprehensive eye examination is a national objective for diabetes prevention and control programs. The CDC also collaborates with the National Eye Institute through the National Eye Health Education Program (NEHEP) to increase public and professional awareness activities related to diabetic eye disease. NEHEP materials designed to educate the public and health care providers are available at [www.nei.nih.gov/publications/publications.htm](http://www.nei.nih.gov/publications/publications.htm).

Saadine J, Benjamin S, Pan L, et al. Prevalence of visual impairment and selected eye diseases among persons aged  $\geq 50$  years with and without diabetes - United States, 2002. *MMWR*. 2004;53:1069-1071.

High blood pressure is detrimental to every aspect of diabetic retinopathy, the researchers said. A policy of tight blood pressure control reduces the risk of clinical complications from diabetic eye disease.

### TREAT EARLY

Ronald Klein, MD, MPH, from the University of Wisconsin, wrote in an accompanying editorial that the UKPDS data support treating type diabetic patients with antihypertensives early in the course of the disease.<sup>2</sup>

However, data indicating the best target level are not currently available. He said that these findings clearly demonstrate the importance of lowering BP to reduce the progression of retinopathy, incidence of macular edema, and loss of vision in persons with relatively short duration of type 2 diabetes and moderate to severe hypertension.

“Ophthalmologists should tell their diabetic patients about the benefits of [BP] control in reducing loss of vision from diabetic retinopathy and emphasize the need for routine monitoring of BP (including measurements at

each eye examination),” Dr. Klein wrote. “New randomized clinical trials, such as the Action to Control Cardiovascular Risk in Diabetes, are currently examining whether, in the context of good glycemic control, a therapeutic strategy that targets a systolic blood pressure of  $< 120$  mm/Hg will further reduce the incidence and progression of retinopathy.” ■

*David R. Matthews, FRCP, is a member of the UKPDS study group and is from Churchill Hospital in Oxford, England. He can be reached at [david.matthews@drl.ox.ac.uk](mailto:david.matthews@drl.ox.ac.uk) or [david.matthews@ocdem.ox.ac.uk](mailto:david.matthews@ocdem.ox.ac.uk).*

*Ronald Klein, MD, MPH, is from the University of Wisconsin in Madison, in the department of ophthalmology and visual sciences. He can be reached at [kleinr@epi.ophth.wisc.edu](mailto:kleinr@epi.ophth.wisc.edu).*

1. Matthews DR, Stratton IM, Aldington SJ, et al. Risks of progression of retinopathy and vision loss related to tight blood pressure control in type 2 diabetes mellitus. *Arch Ophthalmol*. 2004;122:1631-1620.

2. Klein R. Is intensive management of blood pressure to prevent visual loss in persons with type 2 diabetes indicated? *Arch Ophthalmol*. 2004;122:1707-1709.