Type 2 diabetes mellitus linked to the development of glaucoma

Devon Schuyler

Type 2 diabetes mellitus is associated with the development of primary open-angle glaucoma (POAG) in women, according to new data from the Nurses’ Health Study.

“This study is part of the gathering evidence that persons with Type 2 diabetes are at increased risk of having glaucoma,” commented Rohit Varma MD, MPH in an interview with EuroTimes. He said that the finding underscores the importance of annual eye exams, which the American Diabetes Association already recommends for persons with Type 2 diabetes.

“The examination should include not only an examination of the fundus to check for diabetic retinopathy, but also an assessment of intraocular pressure, an evaluation of the optic nerve, and visual field testing to assess whether the patient has glaucoma,” said Dr Varma, who is director of the glaucoma service and the Ocular Epidemiology Center at Doheny Eye Institute, University of Southern California, Los Angeles.

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Louis R Pasquale MD, the lead author of the study in Ophthalmology (July 2006;113:1081-1086), theorised that “whatever is producing insulin resistance may somehow contribute to trabecular meshwork dysfunction, leading to elevated pressure and damage to the optic nerve.”

Dr Pasquale is co-director of the glaucoma service at Massachusetts Eye and Ear Infirmary, Harvard Medical School, Boston and research director of the Ocular TeleHealth Center at the Boston VA Hospital.

A large, prospective long-term study

The study, which spanned the years from 1980 to 2000, included more than 75,000 women from the Nurses’ Health Study. Participants were eligible to become part of the study if they were at least 40 years of age, had no history of glaucoma or cancer, and had complete information on their diabetes status. The women also needed to receive eye examinations during the 20-year follow-up period.

The researchers received copies of the participants’ medical records in order to insure that people met the diagnostic criteria for POAG; a total of 429 participants had their diagnosis confirmed. Of these, 30 had diabetes and 399 did not have diabetes.

The risk of having POAG was higher in patients with diabetes than in those without diabetes (RR = 1.53). The association between Type 2 diabetes and POAG held even after controlling for age, race, hypertension, body mass index, physical activity, alcohol intake, smoking, and family history of glaucoma (RR = 1.82). However, the researchers were surprised to find an inverse relationship between body mass index and POAG after controlling for Type 2 diabetes.

“The more obese you were, the less likely you were to get primary open-angle glaucoma. That took us by surprise,” said Louis R Pasquale MD.

But Dr Pasquale pointed out that other studies have suggested the same thing, including the Barbados Eye Study by Leske and colleagues.

The authors also were surprised to find that the association did not strengthen with longer duration of diabetes. People who had diabetes for less than five years had more than double the risk of POAG (RR = 2.24), while those who had diabetes for five years or longer had only a nonsignificant trend towards increased risk (RR = 1.54). In fact, most of the risk occurred in patients who had diabetes for two to four years (RR = 2.96).

Dr Varma said the fact that the association between Type 2 diabetes and POAG did not increase with increasing length of diabetes was “difficult to explain”, but may have been caused by a lack of standardised assessments in the current study.

“The primary weakness of the study is that they did not do exams on everybody...[the diagnoses were] based on an assessment of medical records, not on their own examinations. However, the authors made considerable efforts at trying to standardise their assessment of glaucoma based on the medical records.”

He pointed out that this could have led to missing and misclassifying cases.

In addition, this study like most other studies on the association between diabetes and glaucoma do not have a very accurate assessment of the duration of diabetes,” he said.

Study fits in with the literature

Dr Varma pointed out that the results of this study are consistent with those of earlier ones, such as the Blue Mountains Eye Study, the Rotterdam Study, and the Barbados Eye Study. But the primary strength of this study is its prospective design, which stands in contrast to cross-sectional designs of the other three.

The results of the current study do stand in contrast to those of the Ocular Hypertension Study (OHTS), which found that diabetes was associated with a lower risk of developing POAG. However, Dr Varma said that a weakness of this particular finding in the OHTS was its reliance on self-reports of the presence or absence of diabetes. He predicted that future publications of the study would drop the reference to diabetes because “that particular finding is not supported by the most robust data.”

Dr Varma said that he doesn’t think the findings were by chance, because this study provides powerful prospective evidence of this association and is part of “a series of papers showing a high relative risk of glaucoma in people who have diabetes.”

He also said he expected that the findings applied to men as well as to women.

Rohit Varma MD

varma@usc.edu

Louis Pasquale@bss.harvard.edu