Patients with a high body-mass index tend to have greater neuroretinal rim areas, suggesting a protective effect of cerebrospinal fluid pressure against glaucoma, according to a study presented by Jost Jonas MD at the 10th European Glaucoma Society Congress.

A multivariate analysis of 2,917 participants in the population-based cross-sectional Beijing Eye Study showed a statistically significant association between a higher body mass index and a larger neuroretinal rim size (P<0.001), said Dr Jonas, University of Heidelberg, Mannheim, Germany.

“That association persisted after adjustment for disc area, refractive error, age, gender, open-angle glaucoma, intraocular pressure (IOP), blood pressure and ocular perfusion pressure,” he added.

The patients in the study ranged in age from 45 to 89 years and had a mean age of 59.8. Dr Jonas and his associates digitalised optic disc photographs from all of the patients’ eyes. They measured the optic disc borders using a planimetric software program. They then measured the width of the neuroretinal rim and measured the diameters of the optic cup and optic disc in the vertical meridian, and used their measurements to calculate the vertical cup/disc diameter ratio and the optic cup area. Then, by subtracting the cup area from the disc area they obtained the neuroretinal rim area, he explained.

Dr Jonas noted that the patients’ mean neuroretinal rim area was 1.97 mm², and mean body mass index was 25.5. Their mean IOP was 15.6 mmHg, their mean diastolic blood pressure was 79.0 mmHg, and their mean systolic blood pressure was 133.5 mmHg.

The multivariate analysis showed that, in addition to the association between a larger neuroretinal rim area and higher body mass index, a larger neuroretinal rim area was also significantly associated with lower IOP (P = 0.004), and lower mean arterial blood pressure (P = 0.02). There was also a marginally significant association between a larger neuroretinal rim area and a higher ocular perfusion pressure (P = 0.066).

“Since body mass index is associated with cerebrospinal fluid pressure, the latter may be associated with neuroretinal rim area”

Dr Jonas noted that a decreased neuroretinal rim area can serve as a surrogate for glaucomatous optic nerve damage. In addition, body mass index appears to correlate with cerebrospinal fluid pressure, and increased cerebrospinal fluid pressure may compensate for high IOP by exerting counter-pressure through the trans-lamina cribrosa, thereby preventing loss of neuroretinal rim and the development of glaucomatous optic neuropathy, he said.

**Difference in results**

He pointed out that various population studies, such as the Nurses’ Health Study and the Health Professionals Follow-up Study and the Barbados Eye Study, have shown a correlation between higher body mass index and a reduced incidence of glaucoma. Other studies have shown the opposite to be the case. He also cautioned that the association between body-mass index and cerebrospinal fluid pressure remains controversial.

“In the population we studied, neuroretinal rim as equivalent of the optic nerve fibres is related to a higher body mass index and a reduced incidence of glaucoma. Other studies have shown the opposite to be the case. He also cautioned that the association between body-mass index and cerebrospinal fluid pressure remains controversial.

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