



## WOMEN'S HEALTH

### Intraocular Pressure and Metabolic Syndrome After Menopause

Elevated intraocular pressure (IOP) is a risk factor for glaucoma and has been linked to cardiovascular disease and insulin resistance, as well as obesity, hypertension, and diabetes. But although menopause has been associated with a higher risk of glaucoma and metabolic syndrome and observational studies have been done on IOP and metabolic syndrome, little is known about the role menopause might actually play, say researchers from CHA University College of Medicine, Seoul, Republic of Korea. They conducted a study to find out more, using data on 4,524 women from the 2008 Korean National Health and Nutrition Examination Survey.

They found that 5.4% of premenopausal women and 28.0% of postmenopausal women had metabolic syndrome. Metabolic syndrome was independently and positively related to IOP in postmenopausal women after adjusting for age, body mass index, smoking status, alcohol con-

sumption, regular exercise, hypertension medication, and diabetes medication. The association did not exist in premenopausal women.

Mean IOP gradually increased with the increasing number of components for metabolic syndrome in postmenopausal women but not in premenopausal women. Intraocular pressure was correlated with blood pressure (BP) and fasting plasma glucose in both pre- and postmenopausal women, but age affected IOP marginally significantly only in premenopausal women ( $P = .076$ ). High BP showed a significant association with high age-adjusted IOP in both groups of women, but high fasting glucose had a significant association with high age-adjusted IOP only in postmenopausal women.

This study, the researchers believe, is the first to focus on the role of menopause status in the relationship between IOP and metabolic syndrome. Other studies, they note, did not separate data for men and women, or did not fully adjust for lifestyle factors, such as smoking, alcohol intake, and physical activity, all known modifiers of IOP.

The researchers suggest some bi-

ological mechanisms that may be at work: One could be insulin resistance, which might stimulate sympathetic activity. Hyperactivation of the ocular sympathetic nerve raises IOP, the researchers note, and parasympathetic activity and subordinate sympathetic activity change with menopause. Another explanation could be that estrogen directly influences target tissues in the eye and acts on the inflow of aqueous humor. The researchers cite studies that have reported that IOP was significantly lower in women taking estrogen therapy, compared with those who had never taken estrogen therapy. And, finally, higher testosterone might influence the degree of IOP; some research has demonstrated that the shift in the testosterone-to-estrogen ratio after menopause may explain the transition in cardiovascular diseases better than does the fall in estrogen. Postmenopausal women may lack the protective benefits of estrogen; higher testosterone due to increased adiposity might cause IOP to rise even higher. ●

Source: Park B-J, Park J-O, Kang H-T, Lee Y-J. *Menopause*. 20(7):742-746. doi: 10.1097/GME.