REFERENCES

1. Ishida S, Usui T, Yamashiro K, et al. $VEGF_{164}$-mediated inflammation is required for pathological, but not physiological, ischemia-induced retinal neovascularization. J Exp Med 2003;198:483–489.
2. Rosenfeld PJ, Moshfeghi AA, Puliafito CA. Optical coherence tomography findings after an intravitreal injection of bevacizumab (Avastin) for neovascular age-related macular degeneration. Ophthalmol Surg Lasers Imag 2005;36:331–335.
3. Davis MD, Blodi BA. Proliferative diabetic retinopathy. In: Ryan SJ, Schachat AP, editors. Retina. Philadelphia, Pennsylvania: Mosby, 2001:1309–1349.
4. Boyd SR, Zachary I, Chakravarthy U, et al. Correlation of increased vascular endothelial growth factor with neovascularization and permeability in ischemic central vein occlusion. Arch Ophthalmol 2002;120:1644–1650.
5. Macugen Diabetic Retinopathy Group. Changes in retinal neovascularization after pegaptanib (Macugen) therapy in diabetic individuals. Ophthalmology 2006;113:23–28.
6. Spaide RF, Fisher YL. Intravitreal bevacizumab (Avastin) treatment of proliferative diabetic retinopathy complicated by vitreous hemorrhage. Retina 2006;26:275–278.

Retinal Vascular Abnormalities and Prevalence of Age-related Macular Degeneration in Adult Chinese: The Beijing Eye Study

Liang Xu, MD, Shuang Wang, MD, Yibin Li, MD, and Jost B. Jonas, MD

PURPOSE: To evaluate whether retinal vessel abnormalities are associated with early or late age-related macular degeneration (AMD) in adult Chinese.

DESIGN: Population-based prevalence study.

METHODS: The Beijing Eye Study included 4439 (83.4%) subjects of 5324 living in a rural area or urban region of Greater Beijing, age older than 40+ years, and invited to participate. The participants underwent a detailed ophthalmic examination, including fundus photography. The photographs were graded using the Wisconsin Age-Related Maculopathy Grading system for evaluation of AMD, and using the Atherosclerosis Risk in Communities protocol for assessment of retinal vascular abnormalities. We examined focal and generalized arteriolar narrowing, arteriolar sheathing, and arteriovenous crossing abnormalities.

RESULTS: Fundus photographs were available for 8655 eyes of 4376 (98.6%) subjects. Neither early nor late AMD was significantly ($P > .15$) associated with any of the retinal vascular abnormalities.

CONCLUSIONS: Retinal vascular abnormalities are not markedly associated with the prevalence of early or late AMD. (Am J Ophthalmol 2006;142:688–689.

AGE-RELATED MACULAR DEGENERATION (AMD) belongs to the most common causes for visual impairment in elderly Caucasian populations of Western countries.[1] Previous population-based studies have revealed that hyperopic refractive error, smoking, family history, and ethnic background are risk factors for the development and progression of the disease.[2,3] Because AMD in its late stage can be associated with a subfoveal neovascularization, what may be a consequence of vascular insufficiency, it was the purpose of this study to evaluate whether retinal vascular abnormalities are associated with the prevalence of AMD in adult Chinese living in mainland China.

The Beijing Eye Study, a population-based prevalence study in Northern China, was carried out in a rural region and in an urban region of Greater Beijing. The Medical Ethics Committee of the Beijing Tongren Hospital had approved the study protocol and all participants had given informed consent. The study has been described in detail previously.[4] Of 5324 eligible individuals age 40 years or older, 4439 (83.4%) individuals participated in the study. For the assessment of AMD, fundus photographs were examined using the classification and grading system recommended by the Wisconsin Age-Related Maculopathy Grading System.[5] Additionally, the retinal vessels were assessed using the protocol of the Atherosclerosis Risk in Communities study.[6] Examined parameters were focal arteriolar narrowing and generalized arteriolar narrowing, arteriolar sheathing, and arteriovenous crossing abnormalities in four fundus regions. Statistical analysis was performed by using a commercially available statistical software package (SPSS for Windows, version 11.5, SPSS, Chicago, Illinois, USA).

Fundus photographs with sufficient quality for examination were available for 8655 eyes of 4376 participants (98.6% of the original sample). Only one randomly selected eye/subject was taken for statistical analysis. The mean age was 56.1 ± 10.5 years (range, 40 to 101 years), and the mean refractive error was −0.37 ± 2.21 diopters (range, −20.13 diopters to +7.50 diopters). Early AMD, late AMD, and exudative AMD, respectively, were present in 1.4%, 0.20%, and 0.10% of the subjects. Presence of early AMD, late AMD, and prevalence of both groups together were not significantly associated with focal arteriolar thinning in the temporal inferior region, the temporal superior region, the nasal superior region, and in the

Accepted for publication May 10, 2006.

From the Beijing Institute of Ophthalmology, Beijing Tongren Eye Center and Capital University of Medical Science, Beijing, China (L.X., S.W., Y.L.); and the Department of Ophthalmology, Faculty of Clinical Medicine Mannheim, University of Heidelberg, Mannheim, Germany (J.B.J.).

Supported by Beijing Key Laboratory Funding, Beijing, China.

Inquiries to Jost B. Jonas, MD, Universitäts-Augenklinik, Theodor-Kutzer-Ufer 1-3, 68167, Mannheim, Germany; e-mail: Jost.Jonas@augen.ma.uni-heidelberg.de

TABLE. Statistical Significance (*P* Values 95% With Confidence Intervals in Brackets) of Correlations Between the Prevalence of Early and Late Age-Related Macular Degeneration and Retinal Vascular Abnormalities in the Beijing Eye Study, a Population-Based Prevalence Study in Greater Beijing

	Early AMD	Late AMD	Early AMD + Late AMD
Focal arteriolar thinning			
Temporal inferior region	0.97 (0.66, 1.56)	0.99	0.83 (–0.005, 0.004)
Temporal superior region	0.78 (0.74, 1.51)	0.46 (0.71, 2.10)	0.74 (–0.004, 0.006)
Nasal superior region	0.85 (0.70, 1.55)	0.99	0.63 (–0.006, 0.004)
Nasal inferior region	0.85 (0.70, 1.55)	0.38 (0.76, 2.07)	0.77 (–0.004, 0.006)
General arteriolar thinning	0.30 (0.30, 1.46)	0.19 (0.87, 1.98)	0.60 (–0.006, 0.003)
Arteriolar sheathing in temporal inferior region	0.66 (0.52, 1.51)	0.15 (0.90, 1.95)	0.99 (–0.004, 0.004)
Temporal superior region	0.99	1.00	0.38 (–0.007, 0.003)
Nasal superior region	0.99	1.00	0.41 (–0.007, 0.003)
Nasal inferior region	0.99	1.00	0.43 (–0.007, 0.003)
Arteriovenous crossing abnormalities in temporal inferior region	0.72 (0.34, 2.11)	1.00	0.37 (–0.007, 0.003)
Temporal superior region	0.86 (0.72, 1.48)	0.99	0.90 (–0.005, 0.004)
Nasal superior region	0.99	0.99	0.95 (–0.005, 0.005)
Nasal inferior region	0.72 (0.34, 2.11)	1.00	0.59 (–0.007, 0.004)

AMD = age-related macular degeneration.
All correlations were statistically not significant.

nasal inferior region; general arteriolar thinning; arteriolar sheathing in the temporal inferior region, the temporal superior region, the nasal superior region, and the nasal inferior region; and arteriovenous crossing abnormalities in the temporal inferior region, the temporal superior region, the nasal superior region, and the nasal inferior region (Table). Performing a binary logistic regression analysis, with the presence of early or late AMD as dependent variable, and age and the degree of focal arterial thinning, general thinning, arteriolar sheathing, and arteriovenous crossing abnormalities as independent variables, showed that the presence of AMD was significantly associated with age ($P < 0.001$) and that is was statistically independent of the retinal vascular abnormalities ($P \geq 0.15$).

The results suggest that retinal vascular abnormalities including focal and general arteriolar thinning, arteriolar sheathing, and arteriovenous crossing abnormalities are not markedly associated with the prevalence of early or late AMD. It confirms a previous population-based study of incident AMD cases in a Caucasian population.[7] One may infer clinically that retinal vascular abnormalities are neither markedly indicative for nor a major risk factor or associated factor of AMD, and that retinal vascular abnormalities may pathogenetically not be pronouncedly connected with the presence of AMD.

REFERENCES

1. Sommer A, Tielsch JM, Katz J, et al. Racial differences in the cause-specific prevalence of blindness in East Baltimore. N Engl J Med 1991;325:1412–1417.
2. Klein R, Klein BEK, Jensen SC, et al. The relationship of ocular factors to the incidence and progression of age-related maculopathy. Arch Ophthalmol 1998;116:506–513.
3. Age-Related Eye Disease Study Research Group. Risk factors associated with age-related macular degeneration: a case-control study in the Age-Related Eye Disease Study Report No. 3. Ophthalmology 2000;107:2224–2232.
4. Xu L, Li J, Cui T, et al. Refractive error in urban and rural adult Chinese in Beijing. Ophthalmology 2005;112:1676–1683.
5. Klein R, Davis MD, Magli YL, et al. The Wisconsin Age-Related Maculopathy Grading System. Ophthalmology 1991; 98:1128–1124.
6. Hubbard LD, Brothers RJ, King WN, et al. Methods for evaluation of retinal microvascular abnormalities associated with hypertension/sclerosis in the Atherosclerosis Risk in Communities study. Ophthalmology 1999;106: 2269–2280.
7. Ikram MK, van Leeuwen R, Vingerling JR, et al. Retinal vessel diameters and the risk of incident age-related macular disease: the Rotterdam Study. Arch Ophthalmol 2005;123:1575 1580.

Rubeosis and Anterior Segment Ischemia Associated With Systemic Cryoglobulinemia

David G. Telander, MD, PhD, Gary N. Holland, MD, Martin B. Wax, MD, and Russell N. Van Gelder, MD, PhD

PURPOSE: To report two cases of iris neovascularization associated with systemic cryoglobulinemia.

AJO.com Supplemental Material available at AJO.com.
Accepted for publication May 5, 2006.

From the Ocular Inflammatory Disease Center, Jules Stein Eye Insti-