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Inside This Issue

Diabetes-related Eye Disease On the Rise

With diabetes rates predicted to soar over the next 4 decades, so too will the number of people with associated eye diseases—and the jump is now expected to be significantly greater than previous estimates had suggested. Saaddine et al from the Centers for Disease Control and Prevention, Georgia, used data from the U.S. National Health Interview Survey (NHIS), the Eye Diseases Prevalence Research Group (EDPRG) and the U.S. Census Bureau to project rates of diabetic retinopathy (DR), vision-threatening DR (VTDR), glaucoma and cataracts among Americans aged ≥40 years through the year 2050. Unlike earlier projections, this study took into account more recent (2004 vs 1999) reports of increases in diabetes incidence, decreases in diabetes-related mortality and expected national demographic trends related to age, race and ethnicity.

The U.S. Census Bureau predicts a U.S. population by 2050 of 402 million, comprising 213 million non-Hispanic whites, 98 million Hispanics, 53 million blacks and 38 million people of other races. Combining these census forecasts with NHIS diabetes data and EDPRG eye disease prevalence estimates, investigators calculated that between 2005 and 2050 the number of middle-aged and older Americans with DR and VTDR will triple, rising from 5.5 million and 1.2 million to 16 million and 3.4 million, respectively, with Hispanics and blacks experiencing the largest spikes, especially among those ≥65 years. They expect the prevalence of glaucoma to rise for all demographic groups, but especially for blacks

aged ≥50 years and Hispanics of all age groups, with those aged ≥65 years projected to experience an 11- to 12-fold increase. The number of cataract cases among people with diabetes, which was 2.96 million in 2005, is projected to reach 9.94 million by 2050, jumping 637% for black women and 677% for black men ≥75 years.

The authors expect their projections to help public policymakers prepare for the imminent surge in demand for vision-related health care among Americans with diabetes. Ideally, these findings will encourage the development of targeted interventions to prevent and manage diabetes and its visual complications.

Saaddine JB, Honeycutt AA, Narayan KMV, et al. Projection of diabetic retinopathy and other major eye diseases among people with diabetes mellitus: United States, 2005-2050. Arch Ophthalmol *2008;126:1740-1747.*

Table 1. *Performance characteristics for the detection of retinal tears in symptomatic age-related PVD (239 patients)*

	Baseline ophthalmoscopy/ biomicroscopy	B-scan US
Identified total tears	25*	27†
False–negative retinal tears	3‡	1
False–positive retinal tears	0	3
Missed eyes with tears	2	1
Identified eyes with tears	24*	25†
Sensitivity§	89% (72–98%)	96% (82–100%)
Specificity	100% (98–100%)	98% (96–100%)
Positive predictive value	100% (86–100%)	89% (86–93%)
Negative predictive value	99% (97–100%)	99% (98–100%)
Negative likelihood ratio	0.08 (0.03–0.30)	0.04 (0.01–0.27)
Positive likelihood ratio	∞	68 (22–211)

**1 eye had 2 retinal tears; †2 eyes were shown to have 2 retinal tears; ‡1 retinal tear was missed in 1 eye that was found to already have 1 retinal tear; §analysis is according to retinal tears.*

Using Ultrasound to Detect Retinal Tears in PVD

Posterior vitreous detachment (PVD), the principal predisposing risk factor for rhegmatogenous retinal detachment, is common with advanced age. Up to 14% of patients with acute symptomatic PVD present with a retinal tear and, without treatment, up to half of these tears result in a clinical retinal detachment.

To prevent retinal tears from progressing to retinal detachment, early diagnosis and treatment are vital. Symptomatically, however, PVD with an associated retinal tear is indistinguishable from uncomplicated PVD. Lorenzo-Carrero et al from Povisa Hospital, Spain, evaluated the performance of B-scan ultrasonography (US) in screening for retinal tears in symptomatic PVD. If it is accurate, the scan would enable ophthalmologists to detect retinal tears in patients with PVD who were poor candidates for recommended visual testing.

Investigators enrolled 250 consecutive patients diagnosed with age-related PVD after presenting to an emergency department with such symptoms as visual floaters or photopsia. They excluded patients whose symptoms had persisted >1 month, those with a history of eye trauma or disease that would affect the vitreous body, and those with media opacity (such as cataract or vitreous hemorrhage) that would impede ophthalmoscopic examination. The final study group consisted of 239 patients (96 men, 143 women; age range, 40–82 years [mean, 65 years]).

Baseline ophthalmoscopic or biomicroscopic evaluation indicated 25 total tears in 24 eyes. By blind B-scan US, the examiner identified 25 "definite" and 5 "suspicious" retinal tears in 28 eyes; 2 eyes had 2 tears each. For analysis,

investigators treated both classifications as positive diagnoses. The final examination revealed 28 total retinal tears in 26 patients, 2 eyes having 2 tears each.

Of the 30 tears diagnosed by B-scan US, 27 were correctly identified, including 3 that had been missed on the baseline evaluation. The 3 deemed to be false positives by unblinded indirect ophthalmoscopy had been classified as "suspicious." B-scan US produced 1 false negative.

Based on the total number of retinal tears, the sensitivity of B-scan US was 96.4% (27/28) and that of baseline evaluation was 89.2% (25/28). The specificity of B-scan US was 98% (210/213) vs 100% (213/213) for baseline evaluation. Positive predictive values were 89% (25/28) for B-scan US and 100% (24/24) for baseline evaluation. Negative predictive values for both were 99% (210/211 and 213/215, respectively; Table 1).

This study demonstrated that B-scan US is an accurate, noninvasive means to diagnose PVD and screen for retinal tears in patients with acute symptomatic PVD. Although indirect ophthalmoscopy with scleral depression is the recommended means of evaluating peripheral vitreoretinal pathology, B-scan US provides a reliable alternative when pupillary dilation or media transparency are insufficient. Because indirect ophthalmoscopy informed by the echographic findings was used successfully as a gold standard to resolve conflicts between baseline and B-scan US evaluation, the study further suggests that combined or parallel testing may improve the detection of retinal tears.

Lorenzo-Carrero J, Perez-Flores I, Cid-Galano M, et al. B-scan ultrasonography to screen for retinal tears in acute symptomatic age-related posterior vitreous detachment. Ophthalmology *2009;116:94-99.*

Cardiovascular Risk Factors For Neovascular AMD

Several risk factors for cardiovascular disease—cigarette smoking, obesity, hypertension, hypercholesterolemia and such markers of endothelial dysfunction as intercellular adhesion molecule 1 and vascular cellular adhesion molecule—have been associated with age-related macular degeneration (AMD). In addition, high levels of the inflammatory marker C-reactive protein (CRP), which are strongly associated with cardiovascular disease, have been associated with the progression from non-neovascular to neovascular AMD.

To clarify the relationship between these risk factors and neovascular AMD, Hogg et al from the Centre for Vision Sciences, United Kingdom, conducted a case-controlled study of 417 participants (mean age, 74.97 ± 6.76 years; range, 49–95 years; 45.1% men, 54.9% women). The participants fell into 2 groups: 212 patients ≥50 years old with a diagnosis of AMD (clinic-based sample) and 215 patients ≥65 years old randomly chosen from 2 local practices (community-based sample). All participants completed structured questionnaires about their

Table 2. *Clinical parameters by AMD grade*

	Grade 0 ($n = 112$)	Grade 1 ($n = 97$)	Grade 2 ($n = 195$)	p value*
BMI	24.5	24.5	27.3	<.001
Hypertension category				.001
Stage 0 (%)	36	37	21	
Stage 1 (%)	39	35	34	
Stage 2 (%)	25	28	45	
Cholesterol (mmol/L)	4.87	5.23	5.41	.001
HDL (mmol/L)	1.15	1.23	5.41	.329
Triglycerides (mmol/L)	1.61	1.40	1.50	.132
CRP (mmol/L)	168.96	216.23	223.85	.142

*Hypertension stage 0 = normal (systolic blood pressure [BP] <120 mm Hg and diastolic BP <80 mm Hg) or prehypertension (systolic BP 120–139 mm Hg and/or diastolic BP 80–89 mm Hg); hypertension stage 1 (systolic BP 140–159 mm Hg and/or diastolic BP 90–99 mm Hg); hypertension stage 2 (systolic BP ≥160 mm Hg and/or diastolic BP ≥100 mm Hg). HDL, high-density lipoprotein. *χ^2 test for categories or Kruskal–Wallis test for continuous data.*

medical histories, and blood samples were taken for serum biochemistry. Members of the community-based sample had fundus photographs taken, which were graded and classified for AMD presence. All participants were categorized by AMD grade: grade 0 (no drusen ≥63 μm nor pigmentary irregularities), grade 1 (drusen ≥63 μm or pigmentary irregularities in ≥1 eye [non-neovascular AMD]) or grade 2 (neovascular AMD).

Patients with AMD grade 2 showed significantly higher body-mass index (BMI), higher hypertension stage and higher cholesterol levels (Table 2). Patients with a history of cardiovascular disease also showed a significantly higher AMD grade ($p < .001$).

These findings suggest that cardiovascular disease may contribute to the development of neovascular AMD or that the 2 conditions may have a common pathogenesis. The authors noted that such results highlight the importance of controlling modifiable cardiovascular risk factors and suggest that treating hypercholesterolemia and hypertension might prevent or delay the onset of neovascular AMD.

Hogg RE, Woodside JV, Gilchrist SECM, et al. Cardiovascular disease and hypertension are strong risk factors for choroidal neovascularization. Ophthalmology *2008;115:1046-1052.*

Prevalence of Clinical ARD in Myopia

Although rhegmatogenous retinal detachment (RRD) is generally associated with such symptoms as diminished vision, visual field defects, and flashes or floaters, affected patients may have no symptoms whatsoever. Among patients with diagnosed RRD, the prevalence of asymptomatic retinal detachment (ARD) reportedly ranges from 9.6–14%. Despite being asymptomatic, such cases can progress, involve the fovea and have significant visual consequences.

To determine the prevalence of clinical ARD (defined as that which extends over 2 disc areas posterior to the equator) in the myopic population, Orucov et al from Hebrew University, Israel, retrospectively examined data on 12,815 eyes of 6547 patients (2907 men, 3640 women) who underwent ophthalmic evaluation at the Hadassah Medical Center between March 2002 and March 2006 in preparation for scheduled excimer laser procedures. They excluded patients evaluated for excimer laser retreatment and those with incomplete documentation.

All eyes included in the study demonstrated a myopia > –0.75. ARD diagnoses were confirmed by indirect ophthalmoscopy and Goldmann contact lens examination by a vitreoretinal surgeon. Practitioners diagnosed clinical ARD in 5 eyes of 4 patients, 2 of whom were lost to follow-up. Scleral buckling was successful in treating the 3 affected eyes of the other 2 patients.

These findings suggest that clinical ARD occurs in about 0.039% of myopic eyes and 0.061% of myopic patients. The authors surmised that it is unlikely that clinical ARD contributes significantly to the incidence of RRD following ocular procedures.

Orucov F, Galbinur T, Frenkel S, et al. Prevalence of clinical asymptomatic retinal detachment in myopic population. Br J Ophthalmol *2008;92:1374-1376.*

In the Next Issue

Fat consumption and AMD

Dislocated intraocular lenses

Retinal vein occlusion and stroke risk

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