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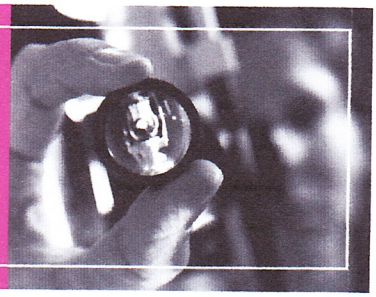

Dietary Risk Factors for Developing AMD

Although genetics is a major factor in the development of age-related macular degeneration (AMD), several research groups have undertaken studies to identify modifiable risk factors, but no associations focusing on diet have proven consistent. To assess how dietary patterns may influence the risk of developing AMD, Amirul Islam et al from the University of Melbourne, Australia, conducted a principal components analysis, a data-driven statistical method used to distribute a large number of intercorrelated variables into a few distinct factors.

Data from the Melbourne Collaborative Cohort Study examined links between diet and chronic diseases in a cohort of >40,000 participants aged 40 to 69 years. At baseline, each participant submitted a food frequency questionnaire of 121 food items, including olive and vegetable oils.

Of the original sample, 21,132 participants had retinal photographs gradable for AMD (defined as ≥1 drusen at least 125 μm in size with or without pigmentary abnormalities, or ≥1 drusen 63 μm to 124 μm in size with pigmentary abnormalities in a 6000-μm diameter grading grid centered on the fovea) taken 10 to 17 years after enrollment. Early AMD prevalence in the cohort was 12.7%; late AMD prevalence was 0.6%.

Principal component analysis was used to identify dietary patterns among the food items, which the researchers defined by those items most likely to define the dietary patterns:

- **Factor 1:** Fruit (stone, citrus and other fruits; olives)

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Table 1. Associations between dietary factor scores at or above the median and AMD[a]

	Early AMD		Advanced AMD	
Factor score	**Odds ratio**	**95% CI**	**Odds ratio**	**95% CI**
Factor 1—Fruit	0.98	0.90–1.07	1.08	0.73–1.59
Factor 2—Vegetables	0.99	0.91–1.09	1.02	0.65–1.59
Factor 3—Grains and fish	1.03	0.94–1.13	0.57[b]	0.37–0.86
Factor 4—Red meat	1.00	0.92–1.10	1.46[b]	1.00–2.17
Factor 5—Processed foods	0.97	0.87–1.07	0.87	0.58–1.31
Factor 6—Salad	1.00	0.92–1.09	1.16	0.79–1.72

[a]Adjusted for age, sex, country of origin, smoking status (never, current, past), education level (below high school level vs equal to or more than high school), multivitamin supplement use and total energy intake. [b]Statistically significant at p < .05. CI, confidence interval.

- **Factor 2:** Vegetables (pumpkin, cauliflower, green beans, potatoes and other vegetables; avoidance of pasta, pizza and salami)
- **Factor 3:** Grains and fish (boiled rice; muesli; steamed, grilled and canned fish; steamed and boiled chicken; certain vegetables, including mushrooms, zucchini, spinach and broccoli; nuts; avoidance of white bread)
- **Factor 4:** Red meat (beef, lamb, fried and smoked fish, eggs; avoidance of whole wheat and rye bread)
- **Factor 5:** Processed foods (cakes, cookies, candy, ice cream, cheddar and similar cheeses, margarine, pudding, eggs, sausages, bacon, ham)
- **Factor 6:** Uncooked salad (lettuce, cucumber, tomatoes, legumes)

The final adjusted model included age, sex, country of origin, smoking status, multivitamin supplement use, education level and total calorie intake. Other data collected, including body mass index, waist–hip ratio, level of physical activity and alcohol intake, had no effect on dietary associations. The odds of developing early or advanced AMD are summarized in Table 1.

The strength of this study was that it did not rely, as other dietary studies have, on predetermined food groupings. Instead, it analyzed the consumption of a large number of foods and subsequently grouped them into dietary patterns.

Based on these results, practitioners should advise patients, especially those with a genetic predisposition for AMD, to consume a diet rich in rice, fish and chicken, and a variety of vegetables, while avoiding red and processed meats, fried foods and white bread.

Amirul Islam FM, Chong EW, Hodge AM, et al. Dietary patterns and their associations with age-related macular degeneration: the Melbourne Collaborative Cohort Study. Ophthalmology *2014;121:1428-1434.*

Surgical Intervention in Cases of Terson Syndrome

Vitreous hemorrhage occurs in 3% to 5% of all cases of Terson syndrome, the occurrence of an intraocular hemorrhage associated with a subarachnoid hemorrhage. While the vitreous hemorrhage usually subsides spontaneously within 10 to 12 months, surgery may hasten the process, potentially preventing complications that include epiretinal membrane formation, macular holes, proliferative vitreoretinopathy, retinal detachment, hemosiderosis, optic atrophy and development of amblyopia. But no clear guidelines exist for ophthalmologic interventions in cases of Terson syndrome.

An interdisciplinary team of ophthalmologists and neurosurgeons led by Skevas et al from the University Medical-Centre Hamburg-Eppendorf, Germany, screened all patients with subarachnoid hemorrhage admitted to their facility over a 2-year period for Terson syndrome. Of the 102 patients from whom consent was obtained, 20 were diagnosed with Terson syndrome at either of 2 examinations (day 1 and day 14), a prevalence of 19.6%. Patients with Terson syn-

drome more often presented with a Glasgow Coma Score of <8 (p = .001), a high Hunt and Hess grade (p < .001) and a high Fisher grade (p = .002).

At the 3-month follow-up visit, Terson syndrome had not resolved in 8 patients (9 eyes). These patients underwent a standard 23-gauge 3-port pars plana vitrectomy. In 4 of these patients (4 eyes), puckering of the internal limiting membrane (ILM) or a deposit of blood beneath the ILM was discovered; these patients underwent additional ILM peeling.

Best-corrected visual acuity in the surgical group, which was 2.2 logMAR at first presentation, improved to 0.0625 logMAR at a final follow-up of 3 to 12 months after surgery (p < .001). Those who underwent ILM peeling improved from 1.725 to 0.05 logMAR (p = .029). Three patients subsequently underwent cataract surgery; no other complications required further surgery.

Although the number of cases was small, this was one of the most extensive prospective studies of treatment for Terson syndrome undertaken to date. Management of patients with subarachnoid hemorrhage requires an interdisciplinary approach that includes specialists in neurology and ophthalmology.

While no consensus has been established for the optimal timing of surgical intervention in cases of Terson syndrome, vitrectomy accompanied by ILM peeling when necessary for vitreous hemorrhage that failed to clear after 3 months improved visual outcomes without raising safety concerns.

Skevas C, Czorlich P, Knospe V, et al. Terson's syndrome—rate and surgical approach in patients with subarachnoid hemorrhage: a prospective interdisciplinary study. Ophthalmology *2014;121:1628-1633.*

Risk Factors for Central Retinal Vein Occlusion

Risk factors for central retinal vein occlusion (CRVO) include the ophthalmologic and the systemic, but researchers studying associations between CRVO and coronary artery disease, kidney disease and cerebrovascular disease have reached inconsistent conclusions, as have studies attempting to measure the suspected association of CRVO and increased mortality.

To resolve this question, Bertelsen et al from the National Eye Clinic for the Visually Impaired, Denmark, conducted a cohort study of 439 patients with photographically verified CRVO diagnosed between 1976 and 2010 at 4 Danish secondary referral centers. This group was paired with a control group of 2195 living patients (5 for every CRVO patient) matched by age and gender. Endpoints included the first occurrence of an event within a given category, death or the end of follow-up.

The study was divided into the 10-year period before CRVO diagnosis and the time between the diagnosis and the designated endpoint. Chronic conditions were classified using hospital discharge diagnoses and drug prescriptions; isolated events were classified using hospital discharge

Table 2. Risk factors associated with CRVO

	Up to 10 years before CRVO diagnosis		After CRVO diagnosis	
	Odds ratio (95% CI)	*p* value	Incidence rate ratio (95% CI)	*p* value
Hypertension	2.03 (1.48–2.78)	<.0001	1.24 (0.85–1.79)	.26
Myocardial infarction	1.57 (1.00–2.44)	.05	2.09 (1.24–3.53)	.005
Congestive heart failure	1.41 (0.84–2.34)	.19	2.27 (1.54–3.35)	<.0001
Ischemic heart disease	1.54 (1.12–2.12)	.009	1.90 (1.32–2.75)	.0006
Diabetes mellitus	2.08 (1.41–3.08)	.0002	1.81 (0.98–3.35)	.09
Peripheral artery disease	3.21 (2.06–5.00)	<.0001	2.11 (1.22–3.63)	.007
Peripheral vein disease	2.10 (1.08–4.09)	.03	3.10 (1.65–5.82)	.0004
Cerebrovascular disease	1.77 (1.23–2.53)	.002	2.09 (1.51–2.89)	<.0001

diagnoses only; both groups were divided by age (<50 years, 50–59 years, 60–69 years, 70–79 years and ≥80 years). Significant risk factors for CRVO present at up to 10 years before diagnosis and after diagnosis of CRVO are summarized in Table 2. During the follow-up (mean, 5.1 years for CRVO patients, 5.7 years for controls), after adjusting for age, sex and date of diagnosis, CRVO patients had a 45% increase in mortality rate over the control patients, a rate that remained even after adjusting individually for related comorbid disorders.

The results suggest that systemic health, particularly cardiovascular and cerebrovascular disease, is associated with CRVO. Treatment of CRVO patients, especially those who also have hypertension and diabetes mellitus, should be coordinated with their primary care physicians.

Bertelsen M, Linneberg A, Christoffersen N, et al. Mortality in patients with central retinal vein occlusion. Ophthalmology *2014;121:637-642.*

Endophthalmitis and Antibiotic Resistance Of Bacteria

Several trials and studies have associated intracameral antibiotics after cataract surgery with a lower incidence of endophthalmitis. But prophylactic antibiotic use during and after surgery remains controversial because it can accelerate bacterial resistance.

To study the shift of the spectrum of organisms that cause endophthalmitis, their evolution in relation to treatment with antibiotics, and ramifications for preventing and treating endophthalmitis, Gentile et al from the New York Eye and Ear Infirmary of Mount Sinai reviewed a total of 988 endophthalmitis isolates (911 eyes; average age, 67 ± 18 years) treated at their institution between 1987 and 2011. The isolates included 618 from a vitreous sample only, 201 from an aqueous sample only, and 169 from both vitreous and aqueous samples.

Of the 988 isolates, 841 (85.1%) were gram-positive, most commonly *Staphylococcus epidermis* (30.3%), *Streptococcus viridans* group (12.1%) and *Staphylococcus aureus* (11.1%). An additional 102 isolates (10.3%) were gram-negative, most commonly *Enterobacteriaceae* (3.4%) and *Pseudomonas aeruginosa* (2.5%). The remaining 45 isolates (4.6%) were fungal; more than half (2.8%) were *Candida* species. All but 2 gram-positive isolates (*Enterococcus faecium* and *Nocardia exalbida*) were susceptible to vancomycin; >90% of gram-negative isolates were susceptible to ceftazidime.

Over the course of 25 years studied, 2 penicillins/ß-lactams (ampicillin, methicillin), 4 cephems (cefazolin, cefotetan, cephalothin, ceftriaxone), clindamycin and erythromycin demonstrated a significant decrease in microbial susceptibility. *S aureus* and *S epidermis* developed significant changes in resistance to methicillin, rising from 18% and 31%, respectively, to 50% each. The pathogens causing endophthalmitis showed no significant changes over the course of the study.

The high susceptibility of gram-positive organisms to vancomycin and of gram-negative organisms to ceftazidime supports the use of these antibiotics as frontline treatments for acute endophthalmitis. No trend toward increased resistance to these antibiotics has been noted; however, increasing incidence of antibiotic resistance among many other organisms means that continued surveillance is necessary.

Gentile RC, Shukla S, Shah M, et al. Microbiological spectrum and antibiotic sensitivity in endophthalmitis: a 25-year review. Ophthalmology *2014;121:1634-1642.*

SPRING 2015

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- Cataract surgery and age-related macular degeneration
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- Fluoroquinolones and retinal detachment