Biomedicine

Joanne Silberner reports from Atlanta at the American Academy of Ophthalmology meeting

Reason to be veiled?

The veil worn by many women in the Middle East may bestow a health benefit.

Khalid F. Tabbara of the University of California at San Francisco and Robert M. Nalbandian of the King Saud Hospital in Riyadh, Saudi Arabia, describe an ocular condition that sounds more like a weather report—climatic droplet keratopathy—that befalls desert inhabitants. They studied 42 cases, marked by what they describe as "a degenerative change of the cornea, characterized by aggregates of small yellowish globules." The eyes of a person with this kind of keratopathy appear to have brown or yellow globs stuck to the surface.

The sun, sand and dust of the desert probably cause the problem, they say. Eighty-eight percent of those they studied were male. "The low prevalence of women with climatic droplet keratopathy among the group studied could be related to the use of the veils," they note.

Do it yourself eye test

In glaucoma, the pressure in the fluid within the eye often is too high. The pressure is monitored by bearing down on a bit of the eyeball to determine how much pressure it takes to flatten it.

But like blood pressure measurements, which are often higher when taken in a doctor's office, eye pressure measurements are sometimes off, too.

"Pressure changes over a day, and sometimes day to day," notes Ran C. Zeimer of the University of Illinois in Chicago. A high morning pressure may be down by the time a patient gets to a doctor's office, but it is these high readings that may point to damage.

Zeimer and his colleagues have developed a home testing kit so the glaucoma sufferer can measure pressure four or five times a day for several days. They instructed 40 patients in how to anesthetize their eyes, and gave them a simplified version of a tonometer, the instrument used to press down on the eye. The 10 percent of readings that were inaccurate they attributed to people who weren't motivated or misunderstood the instructions.

"Home use of a self tonometer is practical for a large number of motivated patients and yields reliable results," the researchers conclude.

Looking at way back then

In the "nothing new under the sun" department, we have this in from ancient India. Ancient writings describe cataract operations performed before the time of Christ, says K.S.R. Krishna of Vijayawada, India.

A surgeon named Susruta, who lived sometime between 800 and 600 B.C., used a procedure in which he pushed a cataractous lens — a lens that is opaque — from its normal position right behind the pupil of the eye back into the interior of the eyeball where it no longer blocked vision. During the procedure, Krishna notes, Susruta irrigated the eye with human milk, and afterwards, the patient had to blow forcefully out of one nostril.

And the Egyptian eye specialists were busy, too. Joseph Sassani of the Pennsylvania State University's Hershey Medical Center, who has studied historical texts, says that they applied healing salves to the eye that were made of mud from the Nile River and crocodile dung. "They used some pretty wild drug combinations, but some of the ingredients may well have contained effective antibodies that could relieve infection and correct some conditions," he says.

And it wasn't exactly an eye for an eye in those times, Sassani notes. Physicians in the time of King Hammurabi risked losing one of their hands if their eye surgery failed. "I imagine physicians in those days practiced pretty conservative medicine and surgery," he says.

Environment

Detecting toxic microdose exposures

Shortly after having her home treated for termites with a combination of the pesticides chlordane and heptachlor, a 48-year-old woman complained to her doctor of nausea, watery eyes, sore throat and chest discomfort. Her medical history offered no clues, and she had no prior occupational exposures to chemicals. So she was given a battery of tests, including an experimental new one that had just been developed by a New Orleans-based company. That last test revealed the only abnormal signs, low but detectable levels of both heptachlor and heptachlor epoxide in the woman's blood. Subsequent tests of the woman's home also showed high airborne levels of heptachlor, notes Victor Alexander, medical director of the company, Enviro-Health Systems, Inc.

Follow-up studies of the woman's health — now conducted monthly — show abnormal liver-function indicators that "track exactly with the levels of pesticide in her blood," says Alexander, who as a physician has been clinically involved in the case. Even though the levels of heptachlor epoxide (the form stored in the body) never exceeded 3 parts per billion in blood, "we're now able to say that she has a mild chemical hepatitis—representing liver damage—caused by these pesticides" he says.

Using a form of gas chromatography, the test analyzes a single blood sample simultaneously for the presence of PCBs and 19 pesticides — including DDT, heptachlor, lindane, chlordane, hexachlorobenzene, dieldrin and mirex. Previously, tests looking for a pesticide may have taken two weeks to return results to the physician. The Chlorinated Pesticide Screening Test, used on 3,000 patients over the last two years, returns test results in 48 hours and costs considerably less than previous tests, say company officials. Able to detect concentrations as low as 0.1 part per billion, it is routinely turning up correlations between chronic low-dose pesticide exposures and adverse health.

Last week Enviro-Health began accepting commercial orders for its second test, a blood analysis of chlorinated phenols, and in December it plans to go commercial with a similar analysis for volatile organic chemicals, such as benzene and hydrocarbon solvents such as trichloroethylene. Next year it will unveil tests for herbicides, such as those used in Agent Orange, and brominated volatiles such as ethylene dibromide (EDB).

Bugging a toxic groundwater hazard

Chlorinated-hydrocarbon solvents, such as trichloroethylene (TCE), are a class of groundwater contaminants that have thus far resisted natural degradation. These general-purpose degreasers are used to clean everything from machinery and electronic parts to clothing. "As far as we know, they're the most common organic [chemical] contaminants in groundwater," explains Environmental Protection Agency (EPA) microbiologist John Wilson. TCEs, occurring in concentrations that can't be tasted, have been linked to cancer and can "cause liver and nerve damage," he notes. At EPA's Kerr Laboratory in Ada, Okla., Wilson thinks he's found a solution for this pollution: Inoculate the water with methanotrophs—methane-loving bacteria.

These organisms contain an enzyme, mono-oxygenase, that allows them to break TCE down into very degradable alcohols. Moreover, they do not appear to cause human disease, Wilson adds. To make the bacteria welcome, however, polluted aquifers will require pretreatment, because methanotrophs need both oxygen and hydrocarbons—like methane, ethane or propane—"conditions that rarely if ever occur in aquifers," he says. But in lab-scale studies, Wilson has shown that they will thrive in TCE-polluted water if that water is oxygenated—perhaps by infusing it with hydrogen peroxide — and supplied with the proper hydrocarbons. Wilson says that water treated in this way shouldn't affect humans who drink it, "but that's a research topic we've got to confirm before we go into the field with it."