Blood test may screen for ovarian cancer

Ovarian cancer usually grows for about 2 years before it produces symptoms, a large British study indicates. The delay explains why doctors diagnose only about one-fourth of cases before the disease has spread to other tissues, according to the researchers.

A sensitive blood test, used in the study to indicate when disease originated, could be widely employed to screen postmenopausal women for ovarian cancer, the researchers assert. Such screening could detect more cases early, when treatments are most effective, they say.

When the cancer is detected while confined to the ovaries, 90 percent of women survive at least 5 years, says Robert C. Bast Jr., an oncologist at the University of Texas M.D. Anderson Cancer Center in Houston. Only 15 to 20 percent of women in whom the cancer has spread beyond the pelvic cavity survive 5 years.

In the new study, a team led by Ian J. Jacobs of St. Bartholomew's Hospital in London measured blood concentrations of a chemical called CA-125 in 22,000 postmenopausal women between 1986 and 1995. Previous studies had shown that CA-125 concentrations rise in the presence of ovarian cancer. The women with normal CA-125 concentrations were then randomly divided into two groups. One group received a blood test annually for the next 3 years; the rest went unscreened.

Among the women with normal CA-125 concentrations at the start, 20 cases of ovarian cancer occurred in the unscreened group and 16 in the screened group. Screened patients survived an average of 6 years from the beginning of the study, compared with 3.5 years for unscreened patients, the researchers say.

The difference may stem from earlier detection of cancers in screened women, says study coauthor Steven J. Skates of the Massachusetts General Hospital in Boston. He spoke at the annual meeting of the American Association for Cancer Research in Philadelphia this week.

Women identified by the initial round of testing as having high CA-125 concentrations received further tests. Some were found to have ovarian cancer. The others were periodically examined, and some of these were later diagnosed with the disease as well.

Any participant whose CA-125 concentration exceeded 30 units per milliliter (U/ml) was retested. If the high reading was confirmed, the woman received an ultrasound examination. Both the test and ultrasound were then repeated every 3 months. Whenever the ultrasound indicated ovarian irregularities, the team referred the woman to a gynecologist, Jacobs and his colleagues report in the April 10 LANCET.

Twenty-eight women diagnosed with cancer during the study had shown subtle increases in the earlier CA-125 tests. These women had not been treated for cancer at that time because those blips hadn't exceeded 30 U/ml or an ultrasound had proved negative.

By reviewing the histories of these women, Skates was able to establish that an average of 1.9 years elapsed from the origin of cancer—as indicated by a CA-125 increase—to the onset of overt symptoms.

Currently, some women with a family risk of ovarian cancer are screened every 2 to 3 years. Skates advocates making screening more widespread and says that testing less often than once a year would be ineffective. After establishing a personal CA-125 baseline for each postmenopausal woman, doctors could watch for any significant changes in the measurement. "You could make the test individually sensitive for each person," he says.

The blood test costs $40 to $50, says Bast, who discovered CA-125. "The big hurdle to ovarian-cancer screening is the fact that only 1 in 2,000 postmenopausal women in Western countries contracts the disease each year," Skates says. "You're looking for a needle in a haystack."

These new findings are "quite important," Bast says. Nearly 15,000 women die of ovarian cancer in the United States each year. *—N. Seppa*

Nature fouls Mexico City's clean-air effort

Officials in Mexico City scrubbed away much of the region's sulfur pollution 7 years ago, but an industrious nearby volcano is undermining that effort by fuming the city with natural emissions, according to a team of Mexican and U.S. scientists.

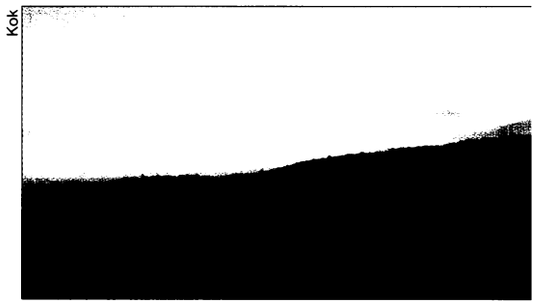
The volcano, called Popocatépetl or the Popo for short, stands 60 kilometers southeast of the mountain-ringed basin that holds Mexico City. During a 2-week period of measurements in November 1997, researchers detected signs that volcanic gases regularly drift down into the basin and mix with the legendary urban smog there, they report in the April 15 GEOPHYSICAL RESEARCH LETTERS.

"You've got a huge urban area—some 20 million people—and you've got a fuming volcano that is impacting the population directly with sulfur dioxide," says Greg L. Kok of the National Center for Atmospheric Research in Boulder, Colo. "Mexico City is probably one of the dirtiest air-quality regions in the world from [human-generated] emissions, and you're adding to this natural emissions."

Kok collaborated with study leader Graciela B. Raga of the National Autonomous University of Mexico in Mexico City and others in setting up a monitoring station in the southwest flank of the basin, 440 meters above the city. During the night and early morning, the site sits above the layer of urban pollution. By late morning, smoggy air rises up the mountainside and envelops the monitoring site.

Raga and her colleagues detected occasional peaks in sulfur dioxide concentrations—at values roughly five to seven times the average—during the night when the mountain air held little human-generated pollution. The researchers concluded that the sulfur was coming from the volcano when winds blew the fumes toward the station and the city.

Mexico City authorities tackled the human sources of sulfur dioxide in the early 1990s, when power plants abandoned high-sulfur fuel and the national oil company introduced low-sulfur diesel.



A mountain research site looks down on the haze over Mexico City. The volcano Popocatépetl is at the far right.

In the atmosphere, sulfur dioxide readily reacts with water to form fine particles called aerosols, which scatter sunlight and produce a milky white haze common in many cities. The sulfur dioxide and sulfate-containing aerosols can cause respiratory problems by triggering asthma attacks and cases of bronchitis, says Douglas W. Dockery, an environmental epidemiologist at the Harvard School of Public Health in Boston.

The peak sulfur dioxide concentrations reported by Raga's team, however, are relatively modest, falling below the U.S. standard, says Dockery.

Emissions from the volcano only reach Mexico City when the winds blow in that direction, adds Mario Molina, an atmospheric chemist at the Massachusetts Institute of Technology who grew up in Mexico City. Nonetheless, he says, "I think these are of concern in that whenever you get these emissions from the Popo drifting to the city, you get an additional stress on the population of the city."

Scientists have yet to study cities closer to the volcano, where pollution presumably presents an even greater threat to human health. Raga and her colleagues plan to measure the sulfate aerosols and heavy metals that the Popo spews onto these cities. *—R. Monastersky*