

Drugs Slash Stroke Risk for Elderly

Treating an age-related type of high blood pressure with drugs cuts the risk of debilitating stroke by more than one-third in people age 60 and older, according to the results of a long-awaited five-year study. The findings may provide dramatic benefits for aging baby boomers, who are expected to develop the life-threatening condition in record numbers by the turn of the century.

"This finding is absolutely extraordinary," says Jeremiah Stamler, a coauthor of the new study. "It's one of the most exciting trials we've ever been involved in," adds Stamler, a long-time hypertension researcher at Northwestern University Medical School in Chicago.

About 7 percent of all people age 60 to 69 develop isolated systolic hypertension, a condition in which the systolic (heart-pumping) blood pressure rises to 160 millimeters of mercury (mm Hg) or more, but the diastolic (heart-resting) pressure remains at the normal value of less than 90 mm Hg. Scientists believe people show signs of the condition as they age, perhaps because the blood

vessels lose their flexibility, a process that forces the heart to pump harder and thus raises the pressure. Indeed, by age 80, nearly one-quarter of all Americans show an elevated systolic pressure, which is associated with a two-fold greater risk of stroke, as well as an increased threat of heart attack.

Despite that well-documented risk, physicians generally have taken a cautious approach to putting their elderly patients on medications. Many prefer not to treat elevated systolic hypertension, fearing that the risks their patients face in using drugs for the rest of their lives outweigh the benefits. Moreover, previous scientific studies had not shown these antihypertensive drugs could protect people from stroke.

Now researchers at 16 medical centers in the United States report data detailing the stroke-lowering benefits and safety of antihypertensive drugs given to elderly men and women with isolated systolic hypertension.

The team recruited 4,736 volunteers with healthy diastolic pressures but dan-

gerous elevations in systolic pressures that ranged from 160 to 219 mm Hg. Then the investigators randomly assigned people to receive daily doses of placebo pills or an active medication. Neither the researchers nor the volunteers in the "double-blinded" study knew who received the placebo and who got the drugs.

Men and women assigned to the active treatment group received either 12.5 milligrams or 25 milligrams of the diuretic drug chlorthalidone per day. (Diuretics help control blood pressure by ridding the body of excess fluid.) For people who remained hypertensive during this initial therapy, the team added other high blood pressure medications (primarily the beta blocker atenolol) to the daily regimen.

Throughout the trial, people taking antihypertensive drugs averaged an 11 to 14 mm Hg drop in their systolic blood pressure compared with the placebo group. More importantly, the team's five-year analysis revealed 5.2 strokes per 100 people in the active treatment group compared with 8.2 strokes per 100 participants in the placebo group.

That finding represents a "highly significant" 36 percent reduction in the total incidence of stroke, says Jeffrey L. Probstfield, study director at the National Heart, Lung, and Blood Institute in Bethesda, Md. Probstfield coordinated the 16-site trial, called the Systolic Hypertension in the Elderly Program or SHEP. People with artery-pounding pressures can suffer strokes when an artery carrying blood to the brain bursts, he notes.

Drug therapy proved healthy for the heart as well as the brain: Compared with controls, the people in the active treatment group showed a 32 percent reduction in cardiovascular problems, including heart attack.

Most elderly people tolerated the low-dose drug regimen without experiencing dangerous side effects, although 13 percent of the people assigned to the active treatment had to stop taking the drugs because of side effects such as headaches or dizziness, the team reports in the June 26 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*.

Such findings suggest doctors can safely treat elevated systolic pressures in most elderly patients, including fragile octogenarians, comments geriatric specialist Margaret A. Winker of the University of Chicago Medical Center.

The study also suggests that older people with isolated systolic hypertension can remain healthy, and perhaps boost their longevity, by taking low doses of antihypertensive drugs, Stamler adds.

— K.A. Fackelmann

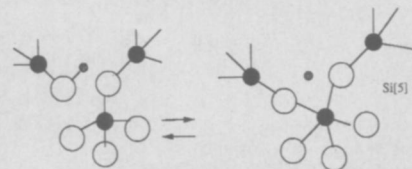
Mobile oxygens make silicate magma flow

Silicon, that marvelous material at the core of glasses, ceramics, sand, computer chips, even magma spewing from volcanoes, has revealed yet another side of its versatile nature to scientists studying its properties.

Researchers knew that silicon-oxygen compounds, called silicates, consist of tetrahedral formations, in which four oxygen atoms surround each silicon. But sometimes, silicon forms a brief relationship with a fifth oxygen atom, geologist Jonathan F. Stebbins from Stanford University reports in the June 20 *NATURE*. Using nuclear magnetic resonance, he has demonstrated the existence of the anomalous silicon in a liquid silicate. He and others think the overcrowded silicon plays a key role in making this liquid flow.

"It's basically a defect and it increases the rate at which things move around," says Frank J. Spera, a geologist at the University of California, Santa Barbara, who studies the molecular dynamics of silicates. "A small concentration can be enough of a disruption [to the liquid's structure] to produce important changes: It breaks down the viscosity of a fluid."

The viscosity of silicon-based magma influences volcanic eruptions. While less viscous magma flows, thicker magmas tend to trap gases inside where



Liquid silicate (left) may flow because silicon atoms (black) briefly take on a fifth oxygen (white) partner, creating this newly discovered five-coordinate silicon intermediate (right).

they "build up like a pressure cooker" until the volcano explodes, says Ian Farnan, a Stanford chemist working with Stebbins. An understanding of the dynamics of the magmas may enable geologists to better assess how violent an eruption will be, he adds.

Theorists had predicted the existence of five- and higher-fold coordinate silicons, which represent intermediate, denser phases of silicate. These would allow an oxygen to shift from one silicon partner to another and consequently enable the liquid to flow. "It's moving closer at the same time that another [oxygen] is moving slightly further away," says Farnan. The researchers caught the oxygen in this dance by rapidly cooling, or quenching, liquid silicate, thereby causing the atoms to freeze in their places.

— E. Pennisi