

Drugs, Diet Ease Mild Hypertension

For some people with mild hypertension, a diet-exercise regimen combined with drug therapy may prove more effective than lifestyle changes alone in reducing the risk of heart attack, stroke, and other serious cardiovascular complications, a new study shows.

Someone with mild (stage one) hypertension has a systolic, or heart-pumping, pressure of from 140 to 159 millimeters of mercury and diastolic, or heart-resting, pressure of from 90 to 99 mm Hg. Researchers are increasingly aware of the hidden dangers of even slight elevations in vascular pressures, which can contribute to a wide variety of cardiovascular complications, such as heart attack and stroke.

In the new study, Richard H. Grimm Jr. of the University of Minnesota School of Public Health in Minneapolis and his colleagues recruited 902 men and women aged 45 to 69. All had mild hypertension. The researchers put all the participants on a program of lifestyle changes that included a diet low in fat, salt, and alcohol and a regimen of increased physical activity. Next, the investigators randomly assigned the volunteers to one of six groups. One group received a placebo pill while the others got one of five different types of blood-pressure-lowering drugs. These included a diuretic (water pill), a beta blocker, an alpha blocker, a calcium antagonist, and an angiotensin-converting enzyme (ACE) inhibitor.

The five-year study showed that people assigned to the lifestyle-drug regimen had about one-third fewer heart attacks or strokes compared with people who got the lifestyle changes and a placebo. The team reports its findings in the Aug. 11 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

Of the five drugs tested, none provided more dramatic benefits than the others. Thus, scientists must conduct additional studies to learn whether certain people with elevated pressures do better on specific antihypertensive drugs, comments Henry R. Black of the Rush-Presbyterian-St. Luke's Medical Center in Chicago. Black wrote an editorial in the same issue of JAMA.

Some public health officials remain cautious about using drugs as a first line of defense against mild hypertension. Lawrence M. Friedman of the National Heart, Lung, and Blood Institute advises people with mild hypertension to lose weight, cut back on their salt and/or alcohol consumption, and exercise regularly.

Some people will do quite well by following that advice and will lower their blood pressures without medication,

concur Grimm. At the same time, the new study shows that drug therapy is a safe and effective alternative for people who can't bring their blood pressure down any other way, he adds.

A related report published in the Aug. 9 ARCHIVES OF INTERNAL MEDICINE adds to these findings. In this study, Barry R. Davis of the University of Texas School of Public Health in Houston and his colleagues studied 587 men and women aged 21 to 65 who were both mildly hypertensive and overweight.

The researchers allowed participants to stay on their usual diet or put them on a weight-loss program. Each person also received either a placebo pill, a diuretic, or a beta-blocker drug.

On average, people on the weight-loss regimen shed about a modest 6 pounds

during the five-year study. Many volunteers who lost weight succeeded in keeping their blood pressure in the normal range, the team found. And for people taking an antihypertensive medication, weight loss significantly reduced the likelihood that they would need a higher dose of the drug to keep their elevated pressures under control.

"Now we have evidence that long-term treatment with weight loss can be successful in many people," Friedman says.

Should all Americans with mild hypertension go on to drug therapy if they can't lose weight? That question remains tricky, Friedman says. He notes that scientists still don't know whether such long-term drug treatment comes with a downside, such as unforeseen health risks.

—K.A. Fackelmann

Chemical analysis reduced to a wee chip

Imagine an entire chemical analysis system compressed onto a single chip—a little lab to carry anywhere, dip into samples, and give instant readings.

Sounds like a Lilliputian fantasy. Then again, maybe not.

D. Jed Harrison and colleagues at the University of Alberta in Edmonton, have built a bite-sized electrophoresis system, which separates compounds based on their densities and electrical charges.

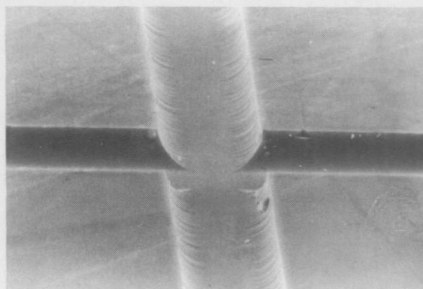
Using ordinary microlithography techniques, the researchers etched capillary-sized channels onto a centimeter-long glass chip. With this tiny electrophoresis lab, the researchers could distinguish six fluorescently labeled amino acids in as little as 4 seconds, with a high rate of accuracy and efficiency. Their report appears in the Aug. 13 SCIENCE.

Based on this prototype, the team says, "It will be possible to develop a complete, miniaturized, integrated system with sample pretreatment, separation, and detection on a 'chip.'"

While their chip itself is not a complete lab, it is a major part of a lab. Down the road, complete chip-sized labs will make possible improved sensors, giving instant readings on a sample's changing chemistry, says chemist Zhonghui Fan, a coauthor of the report.

Scientists could, for instance, use a chip-lab to control quality during drug manufacture, to track an ongoing chemical reaction, or even to monitor blood chemistry inside a person's body.

"This chip is unique for several reasons," Fan says. "It's small and fast. It's a complete integrated separation system



Two intersecting channels, 10 micrometers deep, etched into glass.

on a single chip. And it has no moving parts, which makes it more accurate and reliable."

To fashion the chip, the group used acids to cut channels barely 10 micrometers deep into the glass wafer. After filling the capillaries with an amino acid-rich solution, they applied a strong electrical potential across the sample. The electrical forces both "pumped" the sample through the channels and teased out the various amino acids. The team found it could change the fluid's direction of flow by adjusting the voltage.

In recent years, scientists have built "micromachines"—such as motors, pumps, and valves. But they haven't constructed complete, working mechanical systems. This chip, the researchers assert, demonstrates that whole, miniaturized systems can operate successfully, opening the door to automation on a microscopic scale.

"It will be several years before anyone makes a commercial device," Fan says, "but now we know it can be done."

—R. Lipkin

Harrison et al./SCIENCE