SCIENCE NEWS of the week

Blood Pressure: Questioning a Maxim

In treating patients with high blood pressure, doctors routinely follow the maxim "the lower the better." Now some new research calls that practice into question. In a study of people with mild to moderate hypertension, epidemiologists found that when drug treatment caused a large drop in blood pressure, a person's risk of heart attack was nearly four times that of patients with more moderate decreases.

Patients with very small blood pressure reductions, indicating ineffective treatment, also suffered more heart attacks – about three times more than those with moderate changes. The trend in stroke rates resembled that in heart attack rates. Blood pressure reductions of about 10 percent appeared safest overall, the researchers conclude.

Of the 50 million to 60 million people in the United States with hypertension, 80 percent fall into the mild to moderate category – with a diastolic blood pressure (the pressure between heart contractions) of 90 to 104 millimeters mercury. They are at risk for stroke and for heart and kidney disease, but about 80 percent of deaths among these patients result from heart attack. Because the new findings suggest that aggressive, uniform therapy for hypertension may increase the risk of heart attack in some individuals, blood pressure goals should be kept in the moderate range, says Michael H. Alderman of the Albert Einstein College of Medicine in the Bronx.

Alderman and his co-workers determined the baseline blood pressures of 1,765 people entering treatment for hypertension, 25 percent of whom had abnormal electrocardiograms. Using these readings and measurements taken after treatment, the team calculated changes in blood pressure. And such changes, rather than a particular pressure reading or any other factor, predicted the risk of heart attack, they report in the Aug. 18 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

"The implication is you have to individualize treatment goals," Alderman says. "You can't just have a single number that everybody's blood pressure should be driven down to."

The physiological relationship between blood pressure cuts and heart attacks remains unclear. Too much pressure can damage artery walls, but too little pressure might reduce flow, especially in the many hypertension patients with atherosclerosis. A large drop in pressure could flip the balance and cause blood flow to the heart to plummet, Alderman speculates. Alternatively, he suggests that a patient's strong response to blood pressure drugs – resulting in a drastic drop – may indicate an unknown risk factor for heart attack in that individual. "Maybe it's some sort of vascular reactivity which is reflected in the measure of blood pressure," he says.

Although the epidemiologic results are difficult to explain, Alderman says, "they nevertheless have profound clinical implications." Not all blood pressure experts agree on that. Jeffrey A. Cutler, of the National Heart, Lung, and Blood Institute in Bethesda, Md., remains unconvinced. "The hard data to support doing anything other than lowering blood pressure as far as possible are not available," he contends. On the other hand, calling the report "not in keeping with politically popular thinking," John H. Laragh of the New York Hospital-Cornell Medical Center says it "shows that a moderate blood pressure decrease is the right goal. Too much reduction is as bad as no treatment." – *S. Hart*

Monkey vaccine prevents AIDS-like disease

Scientists have shown that a newly developed vaccine can shield rhesus monkeys from infection caused by a virus closely related to the AIDS-causing human immunodeficiency virus (HIV). The results are preliminary, but researchers believe the work brings them closer to the goal of finding a vaccine to protect humans from the deadly AIDS virus.

"It's the first [published] report of successful vaccine protection against an AIDS-like virus," says Ronald C. Desrosiers of the New England Regional Primate Research Center, an affiliate of Harvard Medical School in Boston. Desrosiers and his colleagues made the vaccine by chemically inactivating the simian immunodeficiency virus (SIV), which resembles HIV genetically and causes an AIDS-like illness in rhesus monkeys. The killed, whole-virus vaccine does not cause illness itself but spurs the monkey's immune system to manufacture SIV-fighting antibodies.

This vaccine production method resembles the one Jonas Salk used in the 1950s to create the first commercial polio vaccine. Last June, Salk, now at the Salk Institute for Biological Studies in San Diego, and Clarence J. Gibbs, at the National Institute of Neurological Disorders and Stroke, presented preliminary results from human and chimp studies using a different AIDS vaccine (SN: 6/17/89, p.375).

In their work, Desrosiers and his colleagues gave six rhesus monkeys five inoculations each with the SIV vaccine. One week after the last vaccination, they challenged the monkeys' immune systems with an injection of live SIV. Two of the six vaccinated monkeys showed no evidence of SIV infection for as long as a year and a half after the challenge, the scientists report in the August PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Vol.86, No.16). Despite repeated testing, the researchers found no SIV in blood taken from either monkey.

Because SIV can evade even sophisticated laboratory detection methods, Desrosiers' group performed one final test to check for infection: They took 10 milliliters of whole blood from each of the two monkeys and transfused it into two unexposed rhesus monkeys. More than four months after the transfusions, recipients showed no sign of SIV infection. "I think at this point it is unlikely that the two [vaccinated] animals will show any sign of infection," Desrosiers says.

Scientists did isolate SIV from the blood of the other four vaccinated monkeys, although those animals show no symptoms of simian AIDS. This suggests they are infected with SIV, but the vaccine delayed their progression to full-blown simian AIDS, Desrosiers says. The four had fewer SIV-infected cells than unvaccinated control monkeys injected with the live virus, further suggesting the vaccine helped them stave off overt disease. Desrosiers says all four are likely to develop simian AIDS eventually.

The four unvaccinated controls developed SIV infection, and three died of simian AIDS 118 to 258 days after the injection. Only one vaccinated animal died during the study, from complications unrelated to SIV, Desrosiers says.

The research holds out hope that scientists will someday develop a safe and effective AIDS vaccine for people, but Desrosiers cautions that his study was conducted under optimal laboratory conditions to see whether a vaccine theoretically could prevent infection with an AIDS-like virus. Though the monkey model closely approximates human AIDS, SIV is not identical to HIV, he points out. Salk and Gibbs are testing a vaccine made from killed whole HIV, and their very early results suggest it may halt disease progression in already-infected people. But many scientists worry about the safety of giving people, especially uninfected ones, whole-virus vaccines that might cause disease.

– *K.A. Fackelmann*