

Doctors: Beware of low diastolic blood pressure when treating hypertension

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By analyzing medical records gathered over three decades on more than 11,000 Americans participating in a federally funded study, researchers at Johns Hopkins Medicine say they have more evidence that driving diastolic blood pressure too low is associated with damage to heart tissue.

The researchers caution that their findings cannot prove that very low diastolic [blood pressure](#)—a measure of pressure in arteries between heartbeats when the [heart](#) is resting and also the "lower" number in a blood pressure reading—directly causes [heart damage](#), only that there appears to be a statistically significant increase in heart damage risk among those with the lowest levels of [diastolic blood](#) pressure.

"The take-home message is there is increased likelihood that if we use [blood pressure drugs](#) to push patients' systolic blood pressures down to 120, which is a strategy supported by recent clinical trials, the consequence in those starting out with low diastolic blood pressures (e.g., below 80) may be that the diastolic number falls so low that we risk doing damage," says J. William McEvoy, M.B.B.Ch., M.H.S., assistant professor of medicine and member of the Ciccarone Center for the Prevention of Heart Disease at the Johns Hopkins University School of Medicine. "Our key finding suggests that for some patients, there should perhaps be modification of intensive anti-hypertensive treatment recommendations issued last year as a result of the [SPRINT trial](#), and that physicians shouldn't look at driving down the top blood pressure number (the systolic number) in isolation without considering

implications of lowering the bottom number."

A summary of the findings was published Aug. 30 in the *Journal of the American College of Cardiology* and coincides with the release of a similar analysis at the European Society of Cardiology Meeting by physicians from Hôpital Bichat in Paris, France.

Released last fall, the SPRINT trial showed protective cardiovascular benefits to patients when physicians aggressively treated [high blood pressure](#) down to 120/80 millimeters of mercury, with a primary emphasis on keeping systolic pressure—the top number, representing arterial pressure when the heart is pumping—at no more than 120.

"Although the SPRINT trial gave good, solid results that lower systolic pressure may benefit some high-risk patients, we wanted to check for potential unintended adverse outcomes that might come with such aggressive blood pressure treatment in patients with low diastolic blood pressure," says McEvoy.

Although they called the SPRINT recommendations praiseworthy, particularly for patients at a high risk for cardiovascular disease, the Johns Hopkins team undertook the new analysis because there were some prior indications that people with very low diastolic blood pressure may suffer from inadequate pumping pressure through the coronary arteries that nourish the heart muscle itself.

For the analysis, McEvoy's group used patient data gathered from 11,565 people in the Atherosclerosis Risk in Communities (ARIC) Study, a National Institutes of Health epidemiological project started in 1987. Participants at the start of the project had an average age of 57; some 57 percent were female, and 25 percent black.

Researchers followed the participants for 21 years in a series of five

visits, with the last check-in in 2013. Each visit included blood pressure measurement, and several included blood testing.

From the blood samples, the ARIC scientists performed high-sensitivity cardiac troponin testing, a way of measuring a protein involved in muscle contraction levels, which rise when there is heart damage from a heart attack or blocked artery.

A troponin value greater than or equal to 14 nanograms per liter of blood indicates heart damage. After controlling for age, race, sex, diabetes, drinking, smoking and other factors, the researchers found that some 1,087 people with diastolic blood pressure below 60 millimeters of mercury were statistically twice as likely to have troponin-indicated heart damage, compared to participants with higher [diastolic blood pressures](#) ranging from 80 to 89 millimeters of mercury.

Some 3,728 people with a diastolic blood pressure between 60 and 69 millimeters of mercury were 52 percent more likely to have heart damage as measured by the high-sensitivity troponin test, with some 120 people in this range showing elevated troponin levels. People with a diastolic blood pressure range from 70 to 99 millimeters of mercury showed no greater risk of troponin-associated heart damage.

The Johns Hopkins team also looked for evidence of a link among low diastolic blood pressure and coronary heart disease—characterized by a buildup of fatty plaque that blocks blood flow—stroke and overall mortality risk.

Of those with the lowest diastolic blood pressure (under 60 millimeters of mercury), 165 had coronary heart disease events, like heart attacks; 56 had strokes; and 345 people died. On average, those with the lowest diastolic blood pressure below 60 millimeters of mercury were 49 percent more likely to have heart disease and 32 percent more likely to

die of any cause.

As expected by the researchers, there was no apparent link between stroke risk and low diastolic blood pressure because evidence is strong that elevated blood pressure overall is a major risk factor for stroke, and the bottom value alone doesn't particular contribute to risk of this outcome.

According to the U.S. Centers for Disease Control and Prevention, about 70 million American adults, or one in three, have high blood pressure. High blood pressure is a major risk factor for heart attacks, stroke, heart failure and kidney disease, and controlling blood pressure with diet, exercise and medicines have vastly improved cardiovascular health, McEvoy says.

McEvoy says further research into the links between very low diastolic pressure and heart damage risk must be done, but he believes the evidence is already suggestive enough to warrant caution in further lowering diastolic pressure in some individuals.

Provided by Johns Hopkins University School of Medicine

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