

Teens Risk Cardiac, Vascular Damage at BPs Below Hypertension

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SAN FRANCISCO, CA — Target organ damage to the heart and blood vessels can occur in teenagers at blood-pressure levels below the clinical definition of pediatric hypertension, preliminary research suggests^[1].

"This means we really need to start early on good lifestyle changes, including healthy diet and exercise, to maintain good levels of blood pressure and body proportions so we can prevent hypertension and the consequences such as heart attack and stroke," Dr Elaine M Urbina (Cincinnati Children's Hospital Medical Center, OH) told *theheart.org* | *Medscape Cardiology*.

The study was presented at the [2017 American Heart Association \(AHA\) Council on Hypertension, AHA Council on Kidney in Cardiovascular Disease, American Society of Hypertension Joint Scientific Sessions](#).

In childhood, high blood pressure is based on percentiles, rather than blood-pressure level. Urbina and colleagues set out to determine whether organ damage in teenagers develops below the 95th percentile—the clinical definition of pediatric hypertension.

They measured blood pressure, left ventricular mass (LVM), and arterial stiffness (pulse-wave velocity [PWV]) in 180 teenagers 14 to 17 years old (64% white, 57% male).

"Using these measures, we've been able to demonstrate that even at slightly lower levels of blood pressure than might be expected to cause damage, there actually are some changes occurring in adolescence," Urbina said.

Based on an average of six systolic blood-pressure (SBP) readings, participants were classified as normal or low-risk (SBP <80th percentile, n=104), mid-risk (SBP 80th to 90th percentile, n=38), or high-risk (SBP >90th percentile, n=38), according to age, sex, and height-specific pediatric cut points. The groups did not differ by age, sex, race, or BMI.

Mean blood pressure increased across the three risk groups, from 109/74 mm Hg in the low-risk group to 126/82 mm Hg in the mid-risk group and 135/87 mm Hg in the high-risk group ($P<0.0001$).

LVM and PWV also increased across groups (LVM 31.5, 34.7, and 35.3 g/m^{2.7}, respectively; and PWV 4.8, 5.2, and 5.3 m/sec, respectively).

There was evidence of organ damage in all three risk groups, the researchers say, and SBP percentile remained a significant determinant of target organ damage after adjustment for relevant cofactors, including demographics, age, and BMI.

The 90th percentile for SBP provided the "best balance" between false-positive and false-negative left ventricular hypertrophy (LVH). However, even at the 80th percentile, 8% of cases of LVH were missed and 16% (29 of 180) had LVH at SBP <95th percentile, they note in their conference abstract.

"The take-home message is that damage may be occurring to important organs like the heart (increased LV mass) at BP levels lower than the established definition of hypertension in youth (the age-, sex- and height-specific 99th percentile of BP in healthy kids)," Urbina told *theheart.org* | *Medscape Cardiology*.

"Therefore, if a patient has persistent hypertension despite lifestyle (diet and exercise), they should consider referral to a pediatric hypertension specialist, who may consider an imaging study to further stratify risk and to inform decisions regarding need for medication. We hope that in the future, we'll have enough data to change guidelines, but we are at a preliminary stage in our research," Urbina said.

Reached for comment, pediatric cardiologist Dr Joseph Mahgerefteh (Children's Hospital at Montefiore, Bronx, NY) said this study provides "very interesting data. It's consistent with what has been done before and in adult populations, and it's reassuring to see the same results in a pediatric population."

The study's statistical analysis was "very nice and well designed in a way to show which percentile of the blood pressure may have the highest gain in finding patients who actually have target organ damage as a result," Mahgerefteh added. "It suggests that maybe if we bring our cutoff to 90th percentile we have a better gain, but it is too early to make that the cutoff."

The study had no funding and the authors have no relevant financial relationships.

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References

1. Urbina EM, Lande M, Meyers K, et al. Target organ damage occurs at SBP levels below the 95th percentile in adolescents: The SHIP AHOY Study. 2017 American Heart Association Council on Hypertension, AHA Council on Kidney in Cardiovascular Disease, American Society of Hypertension Joint Scientific Sessions. September 17, 2017; San Francisco, CA. Abstract 17-HBPR-A-376-AHA.

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