High hormone levels put young black males at risk for cardiovascular disease

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Increased levels of the hormone aldosterone in young black males correlate with an unhealthy chain of events that starts with retaining too much salt and results in an enlarged heart muscle, researchers say.

The findings indicate physicians may want to reach for aldosterone inhibitors early in their effort to control blood pressure and reduce cardiovascular risk in young black males.

Their studies of a cohort of 191 healthy black and white 15- to 19-year-olds showed that only in the black males was higher aldosterone associated with impaired sodium excretion, increased blood pressure and enlargement of the left pumping chamber of the heart, said Dr. Gregory A. Harshfield, hypertension researcher at the Medical College of Georgia and Institute of Public and Preventive Health at Georgia Health Sciences University.

"It's a clear pathway and is consistent with the idea that is the highest risk group for developing earlier and more severe cases of hypertension," Harshfield said. Increased sodium makes the body hold onto more fluid, which increases blood pressure. Unhealthy enlargement of the pumping chamber of the heart, called left ventricular hypertrophy, results from the heart having to work too hard against high blood pressures to push blood and oxygen out to the body. Harshfield's studies have shown that black males particularly have a problem with blood pressure returning to normal following stress because of an impaired ability to eliminate sodium.

"It might be a good idea to consider early on drugs that target aldosterone in these individuals," said Diana G. Murro, a fourth-year student at MCG and first author of the study in the journal Pediatric Nephrology. While aldosterone inhibitors are used to treat refractory hypertension, they typically are not used in blacks, possibly because they haven't been well studied in that population, Harshfield said.

The steroid hormone aldosterone, produced by the adrenal gland, is part of a renin-angiotensin-aldosterone system that helps the body regulate blood pressure and sodium retention. Aldosterone acts on the kidneys, prompting them to hold onto sodium which increases blood pressure. While that can be an asset in some finite scenarios, such as having limited access to water over an extended period, it can become a major health liability in the everyday world where you can consume a day's sodium requirement in single pack of crackers, Murro said.

Each of the other subgroups of young, healthy individuals actually showed some negative impact from higher aldosterone. In white and black females, it correlated with higher baseline blood pressures. In fact, white females had the highest aldosterone levels. In white males, it correlated with reduced sodium excretion. "It was more like we had a piece of the puzzle but not the whole puzzle like we did in the black males," Murro said.

Still, all the findings were concerning, Harshfield said. "This is a normal, healthy group of young people and we are already seeing these associations."

Interestingly, only 16 of the study participants were obese, and there was no significant correlation between obesity – a major contributor to hypertension and heart disease – and higher aldosterone.

Similar studies are needed in hypertensive youth or those with a family history of high blood pressure to see if their findings hold, the researchers said. One of the newer, more selective aldosterone blockers, eplerenone, has proven more effective than the angiotensin II receptor blocker losartan at treating hypertension in a predominantly black, adult male population. While angiotensin is a precursor for

aldosterone, at least one study indicates it's not very effective at directly suppressing aldosterone.

Fewer than half of hypertensive Americans have their blood pressure under control, according to the Centers for Disease Control and Prevention. The MCG research was funded by the National Institutes of Health. Murro worked with Harshfield as a member of the inaugural GHSU Child Health Discovery Institute Summer Scholars Program.

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