Impaired blood vessel and kidney function underlie heart disease risk in people with HIV

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People living with human immunodeficiency virus (HIV) have impaired blood vessel function, which increases cardiovascular disease risk, according to new research published today in the American Heart Association's journal *Arteriosclerosis, Thrombosis and Vascular Biology (ATVB)*. The connection between impaired blood vessel function and cardiovascular disease was especially strong among people with HIV and kidney disease.

Cardiovascular disease is the leading cause of death among people living with HIV, however, the reasons for the strong association have not been clear. This study shows a correlation between HIV and impaired blood vessels, even when HIV is well-controlled.

"People living with HIV infection need to be vigilant about heart disease prevention. They cannot assume that their heart and blood vessel disease risk is low because their infection is controlled," said study author James H. Stein, M.D., the Robert Turell Professor in Cardiovascular Research at the University of Wisconsin School of Medicine and Public Health in Madison, Wisconsin.

Stein and colleagues measured brachial artery flow-mediated dilation, a measure of endothelial function, in participants from 9 studies. The studies included 986 adults living with HIV and 1,547 who did not have the virus.

The analysis revealed:

- People living with HIV infection had about 1% lower flow-mediated dilation (indicating impaired blood vessel function) compared to people without HIV. To put this finding in perspective, a 1% lower flow-mediated dilation is associated with a 10% to 11% increased future cardiovascular disease risk for middle- and older-aged adults.
- HIV disease severity and use of antiretroviral therapy did not notably influence risk of impaired blood vessel function.
- Higher levels of creatinine in the blood, a marker of reduced kidney function, was related to lower blood vessel function among those who were HIV positive.
- Kidney function had a greater connection to blood vessel function in people with HIV than in people without HIV infection.
- Researchers were surprised that patients' control of HIV infection did not appear to have an impact on endothelial function. "The finding that HIV positive status was associated with impaired endothelial function suggests that HIV infection might increase cardiovascular disease risk beyond normal risk factors like cholesterol levels or high blood pressure," said Stein.

"We also did not expect such a large effect from kidney function on HIV patients' endothelial health," said Stein. "Even mild kidney disease might play a role in HIV-associated cardiovascular disease risk."

Researchers measured blood vessel function and not heart attacks, which could be a study limitation, noted Stein. "The test we used quantifies blood vessel dysfunction that could predict bad outcomes, but the results are not a bad outcome on their own."

"Regardless," he said, "people can protect their kidneys and prevent

cardiovascular disease by doing such things as controlling blood pressure and preventing diabetes."

More information: *Arteriosclerosis, Thrombosis and Vascular Biology* (2020). DOI: 10.1161/ATVBAHA.120.315435