U.S. researchers find increasing cases of high blood pressure among HIV-positive people

Researchers at the University of North Carolina have been investigating cardiovascular disease risk among 3,612 HIV-positive people between the years 1996 and 2013. During that time they found that cases of higher-than-normal blood pressure increased threefold. Not surprisingly, people who were obese or who had type 2 diabetes or kidney dysfunction were at increased risk for developing elevated blood pressure. However, researchers also found an interesting association between the timing of initiating combination anti-HIV therapy (ART) and blood pressure. They found that participants who began taking ART before their CD4+ counts fell below the 500-cell mark were less likely to develop higher-than-normal blood pressure (hypertension).

Study details

Researchers reviewed health-related information collected from 3,612 participants. The average profile of participants upon entering the study was as follows:

- age – 36 years
- 71% men, 29% women
- lowest-ever CD4+ count – 173 cells/mm$^3$
- 41% were current or former tobacco smokers
- 18% were co-infected with hepatitis C virus

Results—Hypertension at the start of the study

After all participants underwent medical evaluation and tests, a total of 471 participants were diagnosed with hypertension at the beginning of the study. These participants were likely to have the following risk factors:

- obesity
- elevated levels of cholesterol and triglycerides in their blood
- type 2 diabetes

Results—Hypertension over the course of the study

The remaining 3,141 participants who did not have hypertension were monitored for an average of six years. In that time, a total of 756 new cases of hypertension were diagnosed. Over time, the rate of diagnoses of hypertension increased about threefold.

Risk factors for new cases of hypertension

Researchers found that the following factors were significantly associated with an increased risk for developing hypertension:

- older age (for every 10-year increase in age)
- obesity
- kidney dysfunction
- type 2 diabetes

An immunological connection

After researchers took into account the previously mentioned factors, they found that participants who had 500 or
more CD4+ cells seemed less likely to develop hypertension. We say “seemed” because this was a statistical trend that approached but did not achieve significance. Participants who had an undetectable viral load were at decreased risk for developing hypertension, and this was statistically significant.

Experiments with mice suggest that there is a connection between a dysfunctional or depleted immune system and an increased risk for developing hypertension. However, well-designed studies in people are needed to prove a link between immunological issues and hypertension risk.

The researchers note that having a suppressed viral load may be a sign of “favourable health behaviours” and that such behaviours might lead to improved overall health and a reduced risk for hypertension. So this finding between a suppressed viral load and an apparent reduced risk for hypertension should be treated cautiously.

**Why might rates of diagnoses of hypertension increase?**

Part of the reason that hypertension rates increased over the course of the study is that participants were getting older. However, even after the research team adjusted their findings for the age at which hypertension was diagnosed, cases of hypertension seemed excessive. This likely means that there are factors other than age at play, and the researchers have advanced the following possible explanation:

In the earlier part of the study, some participants were likely ill “with low body weight and generally poor health” and immune deficiency. Such people would have been likely to have low blood pressure. Once they initiated ART, people with severe immune deficiency experienced a return to health, “often presaged by a rapid gain in weight and other dynamic changes in metabolism that may unmask longstanding predilections (genetic, demographic or behavioural) towards hypertension.”

There was no clear statistical link between an increased risk for developing type 2 diabetes and the following treatment-related factors:

- use of HIV protease inhibitors
- length of time on ART

The research team states that it will conduct other analyses in the future that attempt to assess the impact of specific anti-HIV drugs and an increased risk for hypertension.

**Bear in mind**

The present study is observational in design. Such studies can find associations but cannot, for instance, prove that a specific factor causes diabetes. However, the study’s findings with traditional risk factors (obesity, diabetes, kidney dysfunction) make sense and have been found in HIV-negative people.

The present study’s finding about a link between maintaining the health of the immune system (having a high CD4+ cell count) and a reduced risk for hypertension are interesting. A Dutch study reported earlier in this issue of TreatmentUpdate has found a link between immune deficiency and a greater risk for stiffer arteries (a risk factor for cardiovascular disease). Together, the findings from the U.S. and Dutch studies underscore the importance of starting ART early in the course of HIV disease before immune deficiency has occurred. Both studies also point to the importance of screening HIV-positive people for risk factors for cardiovascular disease and, when found, reducing such risks.

Another analysis from the same team of Dutch researchers in the previously mentioned study (above) has found that hypertension was more likely to occur in HIV-positive people than in HIV-negative people. It found that “abdominal obesity” was associated with an increased risk for elevated blood pressure. In part, this increased risk association with abdominal obesity in some participants may have been due to exposure to the older anti-HIV drug d4T (stavudine, Zerit), which is now notorious for causing changes in body shape, including the fat deposits deep within the belly.

**Resource:**

[HIV and cardiovascular disease](#) – CATIE fact sheet
REFERENCES:


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