Has HIV Evolved to Become More Dangerous?

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Twenty-five years into the HIV epidemic, has the virus evolved to become more dangerous? This was the question asked by a research team headed by Nancy Crum-Cianflone, MD, of the TriService AIDS Clinical Consortium at the 2008 joint meeting of the Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC) and the Infectious Disease Society of America (IDSA) in Washington, DC.

Dr. Crum-Cianflone presented new data indicating that, at the time of diagnosis, people with HIV infection are being found to have lower and lower numbers of CD4 cells. One possible explanation, she indicated, is that HIV has evolved over time and may have learned how to evade early detection from the body's own defense.

The study was conducted to determine whether there is any evidence that HIV has become more virulent since the start of the epidemic. Crum-Cianflone explained that when a disease-causing pathogen is introduced into the human population, often it will evolve and perhaps become more powerful.

The first step in testing this theory, Crum-Cianflone said, is to examine whether people infected with HIV are showing a trend of lower CD4 cell counts at the time of diagnosis. If this is occurring, it would suggest that HIV may have evolved into a more aggressive infection and pave the way for studies to analyze HIV to determine whether it is becoming more pathogenic.

Crum-Cianflone's group studied 1,944 people who were diagnosed with HIV and had their initial CD4 count tested within two years of becoming infected with the virus. The study included military personnel who tested HIV positive and received care between 1985 and 2004 at one of the seven military HIV clinical in the United States.

The average CD4 count among those recently infected with HIV decreased over time, the researchers reported. Between 1985 and 1990, the average initial CD4 count was 632 cells. In contrast, people infected with HIV more recently—between 2002 and 2004—had an average initial CD4 count of 499 cells.

When Crum-Cianflone's team made adjustments to its analysis to account for variables that may influence initial CD4 counts—such as uncertainty surrounding the exact dates of infection and factors such as age, gender and race—there was still a downward trend. Initial CD4 counts from 2002 and 2004 averaged 113 cells lower than those documented in people newly diagnosed with HIV between 1985 and 1990. This difference was statistically significant, meaning that it was too

great to have occurred by chance.

Also examined were the percentages of HIV-positive people with initial CD4 counts below 350 cells. Early in the epidemic, this low CD4 count was documented in 12 percent of patients. Between 2002 and 2004, about 25 percent of patients reported initial low CD4 counts.

The researchers noted that the most dramatic decline in the number of CD4 cells occurred up until 2001, but has since stabilized. This suggests that HIV may have adapted into a more pathogenic virus earlier in the epidemic, but has not further evolved during the past several years.

While the numbers are intriguing, Crum-Cianflone cautioned that these data need to be reproduced in other study populations. In addition, she said, studies on the virus itself should be conducted to look for evidence that HIV has changed into a more virulent strain.
