Infectious Disease Series -

"Kick and Kill": The First General Cure for HIV?

More than 7 years ago, the first person was cured of HIV through a very expensive procedure in a very rare case. Now a treatment that would be less costly, should be be safer, and could be applied more universally, is reported in a recent press release from Britain's National Institute for Health Research...

In 2009, the first person cured of HIV created a media splash. However, it required **hematopoietic stem cell transplantation with stem cells from an allogenic donor naturally resistant to HIV infection**. It is rare to find the correct 32 base pair deletion in the HIV co-receptor CCR5 for natural HIV resistance that also fits as an allogenic HLA match for transplantation. Also, hematopoietic stem cell transplantation is risky and costly; however this patient required the procedure to treat acute myeloid leukemia. His doctor was vigilant for just the right donor. With a lucky match, today the patient remains HIV free; however, only this one patient appears fully cured with the approach, and this treatment is not broadly used.

Understanding the dual necessity for both a blood transplant and using a donor naturally resistant to HIV, requires understanding the HIV infection cycle. **The fundamental problem to rid the body of HIV revolves around the latent phase of the infection**, when the virus remains dormant inside cells. Inside the cell genome, the virus has stored its DNA, ready to reactivate at a later time. While T-cells are the main reservoir, the virus can infect other cells as well, and not all are necessarily hematopoietic in origin. So, a hematopoietic stem cell replacement also requires the resistant HIV co-receptor mutation to prevent HIV redistribution from latent pools of virus in cells not eliminated in the transplant. But it also makes this treatment almost impossible except for the most rare cases. So doctors had to accept the trade-off of antiretroviral drugs that keep HIV from progressing and have known safety, but which are not a cure.

What if doctors could eliminate the latent phase of HIV infection? As researchers have investigated this phase of HIV infection they have come to better appreciate how HIV can be reactivated from latency and discovered drugs that do this. While reactivating a virus might sound dangerous, the idea is to use anti-HIV treatments at the same time to give them a chance to kill all cells containing virus, thus preventing any further latent phase hidden virus. **Doctors have started such treatment protocols, termed "kick and kill" or "shock and kill"**, and there are unknowns. For example, different cell types might need different drug activators to prod HIV from its latent phase. That said, a recent press release from Britain's National Institute for Health Research suggests that the treatment looks promising. The virus presently cannot be detected in the first patient treated with their protocol.

This treatment has obvious advantageous if it shows continued success. It could be applied more universally, would be less costly, and should be safer. Many should be able to live much more normal lives. However, the drugs are expensive, and this treatment might remain outside the affordability for many patients in developing countries. **For eradicating the disease, doctors probably will still need a vaccine.**

References:

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