



Hope or hype

Can bone marrow transplants cure HIV?

by *Chrystal Palaty*

In the last few years, there's been a lot of press about the so-called "Berlin Patient." In 2007, Timothy Ray Brown was a 40-year-old HIV-positive American living in Germany who received a bone marrow transplant to treat acute myeloid leukemia. During the procedure, his own immune system was destroyed and replaced with stem cells from a donor who had the very rare CCR5-delta32 mutation, which can make people resistant to some forms of HIV. As a result, Brown appears to be cured of HIV, with an undetectable viral load even without highly active antiretroviral therapy (HAART).

The idea of treating HIV-positive people with a bone marrow transplant to replace depleted CD4 cells and reduce the reservoir of HIV was first suggested in the 1980s. There were previous attempts, and while people survived, they required continued HAART to keep the HIV under control.

Brown's case is a medical breakthrough and is taking medicine and science to new places. It gives researchers important information and advances ideas about genetic approaches to treat and cure HIV. In this case, viral replication has been stopped for more than two years without HAART, despite the fact that Brown was immune-suppressed.

This case will hopefully inspire new genetic therapies and other approaches to using CCR5-delta32 deleted stem cells to cure HIV. Scientists are trying to reproduce these results by using the delta32 mutation in other people who are HIV-positive and have cancer.

But will this become a routine procedure to cure HIV? Probably not, and here's why.

Fact 1: Bone marrow transplants are brutal

The idea of the bone marrow transplant is to completely remove a person's immune system using drugs or radiation, and then replace it with immune cells from a donor. These immune cells will then take over, repopulate, and rebuild the recipient's immune system. About 15,000 bone marrow transplants are performed each year to treat over 70 diseases, including acute leukemia. The transplants are hard for patients to endure.

The chance of finding a bone marrow donor that's immune compatible and has the CCR5-delta32 mutation ranges from about one in 600,000 to one in ten million. Not great odds.

To prepare for his transplant, Brown underwent a high-intensity myeloablative regimen to irreversibly destroy his immune system. This included full-body radiation, chemotherapy, as well as antibodies and transplant drugs. It's a risky procedure with a death rate of over ten percent, in addition to side effects such as nausea, vomiting, fatigue, loss of appetite, mouth sores, hair loss, and skin reactions.



Short-term risks include susceptibility to infection, bleeding, and graft versus host disease, which can happen when the new immune system from the donor starts to attack the recipient's cells. Long-term complications from some of the radiation and drugs can include other new cancers, treatment-induced myelodysplastic syndromes, and new autoimmune disorders.

Brown had to endure the procedure twice. His leukemia reappeared after 13 months, so he required a second transplant from the same donor. After each procedure, he didn't have to resume HAART, but he did have to take immunosuppressive drugs.

As well, Mr. Brown needs to undergo frequent testing and ongoing monitoring for any reappearance of leukemia, for early signs of graft versus host disease, and for organ damage. He's also being monitored for signs of HIV infection in his organs, including his brain, bone marrow, liver, and intestines.

Fact 2: Finding the right donor is a huge challenge

A bone marrow transplant is similar to other types of organ transplants, in that the donor and recipient have to be an almost identical match. The chance of finding an immunologically compatible donor who isn't a family member ranges from one in 20,000 to one in 100,000.

In addition, the donor must have the rare CCR5-delta32 mutation, which is estimated to appear in only one to three percent of people from a Northern European ancestry. That means the chance of finding a bone marrow donor that's immune compatible and has the CCR5-delta32 ranges from about one in 600,000 to one in ten million. Not great odds.

As well, because this mutation is only found in Caucasians, people from other ancestries will be less likely to find a suitable donor.

Fact 3: We don't know the long-term impacts. Is his HIV cured forever?

Brown has been HIV-free for several years. While his doctors haven't detected infected cells or HIV, there are anti-HIV antibodies in his bloodstream, which may be left over from before his transplant or from a fresh immune challenge. This raises the possibility that there may still be HIV reservoirs somewhere in his body that thus far are successfully controlled by his immune system. And while he may be cured, he certainly isn't resistant to future infections; lab tests have shown that his new immune system isn't resistant to other HIV strains, and may be infected if exposed again.

Even if it were possible for you to cure your HIV with a bone marrow transplant—assuming you found the perfect donor—would you want to do it? There are many considerations in terms of care costs, and uncertainties around life expectancy, quality of life, and the physical risks.

For now, we can join the rest of the world in following Brown, the Berlin Patient, as he'll likely remain a medical celebrity for the rest of this life. And we'll have to wait and see if the other people selected for this procedure have the same results. ☺



Chrystal Palaty is a Vancouver-based technical writer who translates science into English.

BCPWA ADVOCACY DEPARTMENT



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Advocates meet with HIV-positive individuals throughout the week at:

- Dr. Peter Centre > Friday > 9AM -11AM
- Lighthouse > Abbotsford > Thursday > 12PM - 4PM
- BCPWA > daily > 10AM - noon; 1PM - 4PM



The Advocacy 'Housing Team' can help you develop a plan to access affordable housing. Every Wednesday from 10AM - noon at BCPWA.



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