

Most patients recover from 'chemo-brain' by 5 years after stem cell transplant

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Many patients who undergo bone marrow or blood stem cell transplantation to treat blood cancers or a "pre-leukemic" condition called myelodysplasia experience a decline in mental and fine motor skills due to the toll of their disease and its treatment.

A new study led by researchers at Fred Hutchinson Cancer Research Center, published in the May 2, 2011 online edition of the *Journal of Clinical [Oncology](#)*, found that overall, these effects are largely temporary and that most patients can expect a return to normal motor and [memory function](#) within five years. However, the study also found that deficits in fine motor skills and [verbal memory](#) remained for a significant percentage of patients and warrant more attention by [health care providers](#).

It has been widely documented that powerful [chemotherapy](#) drugs that [leukemia](#) and [lymphoma](#) patients receive prior to hematopoietic transplantation (HCT) – as well as medicines to combat graft-versus-host disease – can impact motor and memory skills. The purpose of the new study, led by Karen Syrjala, Ph.D., director of Biobehavioral Sciences at the Hutchinson Center, was to determine whether patients recover from these neurocognitive deficits within five years of transplant.

For the study, Syrjala and colleagues identified 92 patients who had received an allogeneic (cells from a donor other than themselves) bone marrow or stem cell transplant for chronic myeloid leukemia, acute leukemia, lymphoma or myelodysplastic syndrome, an umbrella term for

several "pre-cancerous" diseases in which the [bone marrow](#) does not function normally.

For comparison purposes, the patients were asked to nominate a case-matched control, such as a sibling or friend of the same gender and similar age who had neither received a transplant nor were in active cancer treatment. The transplant patients and control subjects were then given a battery of tests – all by the same test giver – to assess their memory and motor skills.

The tests included immediate and delayed recall of a list of words, saying out loud as many words as possible that begin with specific letters, the ability to sequentially link letters and numbers on paper, learning to match numbers and symbols and write the symbols on paper to match random numbers, and putting toothpick-sized pegs into holes as fast as possible.

Analysis of the tests results showed that most patients made substantial improvements in neurocognitive function over the five years after their transplant. "However, contrary to expectations, neither motor dexterity nor verbal learning and retention improved between one and five years," the authors wrote. "Deficits were most notable in motor speed and dexterity."

Described as mostly mild, the neurocognitive dysfunctions remained at five years for twice as many long-term survivors (41.5 percent) versus controls (19.7 percent).

Syrjala said the researchers were surprised by the evidence of continued impairment.

"We really thought the rates would be lower," Syrjala said. "We were thrilled to see that people recovered substantially, but we also were

surprised that so many people did continue to have measurable deficits in some areas even after five years."

Syrjala said the reasons for persistent deficits are unknown and more research is needed to examine the causes. One theory is that some cancers, especially leukemia and lymphoma, are "whole-body" cancers because blood circulates throughout the body and these diseases may cause their own neurocognitive impacts, in addition to what chemotherapy may contribute.

"The major clinical implication of this research is to assure HCT recipients and their health care providers that further progress will occur in their information processing capacity between one and five years after treatment," the authors wrote. "However, it is equally important to validate for long-term survivors that not all HCT recipients fully recover neurocognitive function by five years. These results provide further indication of the need for cognitive rehabilitation strategies after one year for those residual deficits."

The investigation is the first to prospectively follow the same group of patients for five years for any cancer, according to the authors. The study builds upon previous findings by Syrjala and colleagues, published in 2004, which followed the same group of patients to one year after transplant. That study also found that neurocognitive impacts of transplantation are largely temporary.

Provided by Fred Hutchinson Cancer Research Center

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