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Printed February 1, 2015 from <http://www.cancer.net/new-study-shows-breast-cancer-survivors-who-were-treated-cmf-chemotherapy-may-have-subtle-long-term>

## **New Study Shows That Breast Cancer Survivors Who Were Treated With CMF Chemotherapy May Have Subtle Long-Term Cognitive Difficulties** [1]

*JCO Research Round Up*  
February 27, 2012

A new study published online February 27, 2012 in the *Journal of Clinical Oncology* suggests that breast cancer survivors who were treated with a common chemotherapy regimen between 1976 and 1995 show worse cognitive performance than women of the same age who never had cancer. The differences emerged mainly in the domains of learning, memory, information processing speed and psychomotor speed. This is the first study to show that such problems, which are known to occur shortly after treatment, may also be present even 20 years after treatment.

The chemotherapy regimen evaluated in the study, called CMF, was routinely used to treat women with breast cancer from the 1970s through the 1990s - and many of these now breast cancer survivors are still alive today. CMF involves a combination of the drugs cyclophosphamide, methotrexate, and 5-fluorouracil. Today CMF is used much less frequently, replaced by newer anthracycline based regimens with better efficacy.

In this study, Dutch researchers compared the results of neuropsychological tests among 196 women with breast cancer who received CMF chemotherapy following breast cancer surgery between 1976 and 1995 against those of women without cancer. Participants were assessed between November 2009 and June 2010. In addition to the neuropsychological examination, participants were also assessed for depression and self-perceived memory problems. The control group was selected from a population based cohort and included 1,509 women who had no history of cancer. All women included in the current study were between the ages of 50 and 80 when they were first enrolled.

Adjusting for a range of statistical factors, the investigators found that women who had received CMF chemotherapy were more likely than women in the control group to have low scores in tests of immediate and delayed verbal memory (the ability to recall words), information processing speed, inhibition and psychomotor speed (coordination of thinking and hand movement, such as

putting pegs in a board).

The magnitude of the effects was comparable to approximately six years of age-related decline in cognitive function. The women who had received chemotherapy also had more memory complaints than women in the control group.

Prior studies have shown that chemotherapy can have immediate effects on cognitive function, such as causing forgetfulness or problems processing information, which can last five to ten years. Yet until the current investigation, the long-term cognitive effects of chemotherapy have been unknown.

Researchers said they plan to continue studying the effects of chemotherapy on the brain and hope to determine which patients are most susceptible to cognitive problems. They also want to explore differences in cognitive function between breast cancer survivors who had chemotherapy and cancer survivors who did not have chemotherapy (as opposed to women without cancer in the current study), to determine if cancer itself affects cognitive functioning.

### **What This Means for Patients**

Thanks to screening and treatment advances, today there are more long-term breast cancer survivors than ever before, but there is still a lot to be learned about the long-lasting effects of cancer and related therapies. This study suggests that subtle cognitive deficits may be among the long-term effects of chemotherapy, especially of regimens that were more frequently used through the 1990s.

Breast cancer survivors and their healthcare providers should be aware of the possible long-term effects of past CMF chemotherapy, including mild cognitive problems, and discuss any concerns. While there is currently no treatment to restore lost cognitive function, there are skills people can learn to help them manage their daily routines more easily.

### **Helpful Links:**

[Guide to Breast Cancer](#) [2]

[Side Effects of Chemotherapy](#) [3]

[Attention, Thinking or Memory Problems \(ATMP\)](#) [4]

[Late Effects](#) [5]

[Survivorship](#) [6]

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### **Links:**

[1] <http://www.cancer.net/new-study-shows-breast-cancer-survivors-who-were-treated-cmf-chemotherapy-may-have-subtle-long-term>

[2] <http://www.cancer.net/patient/Cancer+Types/Breast+Cancer>

[3] <http://www.cancer.net/patient/All+About+Cancer/Cancer.Net+Feature+Articles/Side+Effects/Side+Effects+of+Chemotherapy>

[4] <http://www.cancer.net/node/25044>

[5] <http://www.cancer.net/patient/Survivorship/Late+Effects>

[6] <http://www.cancer.net/patient/Survivorship>