Surprising results in USC study of cancer surviving twins

December 20 2011, By Eddie North-Hager

The study of cancer survivors defined cognitive impairment as having problems in memory and thinking.

(Medical Xpress) -- Older female cancer survivors are significantly more likely to suffer from long-term cognitive impairment after diagnosis and treatment compared to their twin sibling with no history of cancer, a USC study found.

The risk was higher among survivors of gynecologic cancers and those who had treatments directly or potentially affecting ovarian functioning, according to the study published in *The Journals of Gerontology*.

Findings suggested localized treatments that affect estrogen-producing areas may be associated with serious impairment of memory and thinking in older women, according to co-author Margaret Gatz.

“This is not the result we expected,” said Gatz, professor of psychology, gerontology and preventive medicine in USC Dornsife, and co-author of the study. “We expected chemotherapy would have a larger effect. This surprised us deeply. The results showed that either surgery, radiation or pelvic cancer itself accounts for the increased risk of cognitive impairment.”

The study defined cognitive impairment as having significant problems in memory (such as not being able to remember three words over a short delay) and thinking (such as not being able to explain similarities and differences between pairs of common items), to the extent that the problems affected the management of daily life.

The association was strongest in women whose cancer treatment affected the pelvic area, resulted in ovary removal and/or when radiation was used in the pelvic area. Since most of the women in the study were past menopause, the effect on estrogen production was not as dramatic, but cognition impairment nonetheless was significant.

The study seems to confirm that estrogen, even in older women, is important, Gatz said.

The next hypothesis to be studied by lead author and USC graduate student Keiko Kurita for her dissertation is the role of ovaries, which produce estrogen, in cognitive performance.

"When we found that female, but not male, cancer survivors were at an increased risk for cognitive impairment compared to their co-twins, we were eager to uncover the reasons that might explain this,” said Kurita, who is advised by Gatz and Beth Meyerowitz, a USC psychology professor who is corresponding author of the study. “On my dissertation project, we will be examining the possible relation between cognitive functioning and ovarian removal, a research question that grew directly

from the findings that we have just published."

The study reviewed more than 400 pairs of twins who participated in cognitive screening at least three years after one had ended cancer treatment.

Gatz, who is chair of USC Dornsife's psychology department and a foreign adjunct professor with the Karolinska Institutet in Stockholm, Sweden, is one of the few researchers with access to the Swedish Twin Registry, the largest comprehensive twin registry in the world. The registry is a set of records on same-sex twins born between 1886 and 1925.

Studying twins from a statistical standpoint mitigates genetic or early childhood causes of both cancer and cognitive deficits because twins usually possess similar genetic and early environmental influences. The comparison with cancer-free twins means the increased dysfunction cannot solely be attributed to the normal aging process.

Cognitive effects on the twins were evaluated using a standardized interview that evaluated mental status. The study was designed to rule out the short-term side effects of cancer treatment by separating the cognitive tests and the end of treatment by at least three years.

Per Hall of the Karolinska Institutet also was a co-author.

In a 2005 study, Gatz, Meyerowitz, Hall, and USC doctoral student Lara Heflin found long-term cancer survivors over age 65 were twice as likely to develop cognitive problems as individuals who never had been diagnosed with cancer. The study did not suggest a cause for the cognitive problems in cancer survivors.

Provided by USC College