Women at lower risk of breast cancer after ovarian cancer diagnosis, research suggests

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Women treated for ovarian cancer caused by an inherited faulty gene have a lower risk of developing breast cancer following that treatment, new research from Manchester University NHS Foundation Trust (MFT) and The University of Manchester has revealed.

MFT researchers say it is likely this is because of the platinum-based chemotherapy that is widely used to treat ovarian cancer.

This is the largest study of breast cancer after ovarian cancer diagnosis to date and was supported by the National Institute for Health and Care Research (NIHR) Manchester Biomedical Research Center (BRC).

BRCA1 and BRCA2 are genes that greatly raise the risk of developing cancer if they become altered (or mutate).

Previous research estimates there is a 72% risk of developing breast cancer by age 80 for people with BRCA1 and a 69% risk for people with BRCA2 gene mutations. However, this did not specifically assess the risk of breast cancer following ovarian cancer diagnosis.

Two studies that have addressed this had follow up largely limited to 10 years and had no breakdown by gene. These studies estimated the risk of breast cancer after ovarian cancer diagnosis to be 11% in 79 women and 7.8% in 509 women.

In this latest study, MFT researchers reviewed the history of breast cancer in 701 women with ovarian cancer who had the faulty BRCA1 or BRCA2 gene.

Women included in the study had attended specialist genetics clinics at MFT, East Cheshire NHS Trust, Mid Cheshire Hospitals NHS Foundation Trust, and Lancashire Teaching Hospitals NHS Foundation Trust.

Incidence of breast cancer was assessed annually by age group and for up to 15 years following ovarian cancer diagnosis.

Their analysis has shown for those with the faulty gene, the likelihood of developing breast cancer in the first five years after an ovarian cancer diagnosis is significantly lower than for those without ovarian cancer.

"Our findings mean we can reassure women that their risk of breast cancer in the first two years (short term) after diagnosis is relatively low at around 2% to 2.5%. This is likely because of the effects of platinum-based chemotherapy, which is widely used to treat ovarian cancer, resulting in control and potentially complete eradication of breast cancers that otherwise could have occurred in the first five years," says Professor Gareth Evans.

The study was led by Professor Gareth Evans, Consultant in Medical Genetics and Cancer Epidemiology at MFT and The University of Manchester and NIHR Manchester BRC Cancer Prevention and Early Detection Co-Theme Lead.

He said, "Many women we speak to who have a new diagnosis of ovarian cancer immediately ask about bilateral mastectomy (removal of both breasts) as an option to manage their cancer risk. Many are upset to hear they need to delay this to the required two-year point of disease-free survival from ovarian cancer.

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The results, published in *Genetics in Medicine*, show that for those with ovarian cancer and the BRCA2 gene, the low rate of breast cancer continues until 10 years of follow up. Their breast cancer risk after ovarian cancer diagnosis was 3.3% at two years, 6.2% at five years, 10.4% at 10 years, and 20.3% at 15 years.

For those with the faulty BRCA1 gene, incidence of breast cancer was lower between zero and five years after ovarian cancer diagnosis, but risk increased between five and 10 and after 10 years of follow up. Their breast cancer risk after ovarian cancer diagnosis was 2.1% at two years, 5.0% at five years, 15.0% at 10 years and 29.1% at 15 years.

The researchers say women need to be aware of these increases, especially after 10 years.

Professor Evans said, "For those with BRCA2, lower rates of breast cancer continue until 10 years of follow up as this gene is more sensitive to chemotherapy than BRCA1.

"In women with good long-term life expectancy, the higher risks of breast cancer after 10 years, particularly in BRCA1, should be discussed with their clinicians. This includes presenting all the available options such as MRI screening and risk reducing mastectomy."

More information: D. Gareth Evans et al, Breast cancer after ovarian cancer in BRCA1 and BRCA2 pathogenic variant heterozygotes: Lower rates for 5 years post chemotherapy, *Genetics in Medicine* (2024). DOI: 10.1016/j.gim.2024.101172

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