# Diagnostic chest radiation before 30 may increase breast cancer risk

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Women carrying a mutation in the BRCA1- or BRCA2- genes (which control the suppression of breast and ovarian cancer) who have undergone diagnostic radiation to the chest before the age of 30 are more likely to develop breast cancer than those who carry the gene mutation but who have not been exposed, a study published in the *British Medical Journal* today reveals.

The BMJ published a commentary in August which argued that a breast cancer charity was using misleading statistics to persuade women to undergo mammography, concluding that charities should stop generating false hope and that women need and deserve the facts instead.

Exposure to radiation is an established risk factor for breast cancer in the general population. Some studies have suggested that women with a mutated BRCA1/2 gene may have increased radiation sensitivity because BRCA1 and BRCA2 are the genes involved in the repair of DNA breaks , which can be caused by radiation. The benefit from mammographic screening in young BRCA1/2 mutation carriers may therefore not outweigh the radiation risk. Some countries have even gone as far as recommending that women avoid mammographic screening before the age of 30 but results of studies have been inconsistent.

Authors from the Netherlands Cancer Institute therefore looked at 1993 female BRCA1/2 mutation carriers in the Netherlands, France and the UK between 2006 and 2009 to see whether variations in DNA increase the chances of radiation-induced breast cancer risk. Follow-up ended

with diagnosis of first breast cancer. All patients were aged 18 or over.

Women were questioned on exposure via x-ray or mammogram, age at first exposure, number of exposures before age 20, at ages 20-29, 30-39 and age at last exposure.

Results showed that 43% (848) of the 1993 women were diagnosed with breast cancer. 48% (926) reported ever having an x-ray and 33% (637) a mammogram. The average age at first mammogram was 29 years. A history of any exposure to diagnostic or screening radiation to the chest at ages 20 to 29 increased breast cancer risk by 43% and any exposure before the age of 20 increased breast cancer risk by 62%. No association with breast cancer was apparent for exposures at ages 30-39.

For every 100 BRCA1/2 mutation carriers aged 30, nine will have developed breast cancer by the age of 40 and the number of cases would increase by five if all had had one mammogram before age 30. The authors do say however that this estimate "should be interpreted with caution because there were few women with breast cancer who had had a mammogram before age 30 in the study".

The authors conclude that "exposure to diagnostic radiation before age 30 was associated with an increased breast cancer risk in BRCA1/2 mutation carriers". They say however due to "puzzling" findings in the differences between breast cancer risk for BRCA1 and BRCA2 carriers, larger studies are needed to determine whether a difference does in fact exist. The authors recommend non-ionizing radiation imaging techniques, such as MRI, for mutation carriers.

**More information:** Exposure to diagnostic radiation and risk of breast cancer among carriers of BRCA1/2 mutations: retrospective cohort study (GENE-RAD-RISK), *British Medical Journal*, 2012.