

Mother-daughter breast density study points way to earlier cancer risk assessment

April 30 2009

A unique mother-daughter study that used magnetic resonance to measure breast density in younger women shows that percent of breast water could be linked to the risk of breast cancer in middle age and older.

The findings, published online today in *Lancet Oncology*, add another key piece to the puzzle of understanding more about breast density, an inheritable characteristic known to be a cancer risk factor, that could aid in developing prevention methods, says principal investigator Dr. Norman Boyd, a scientist at The Campbell Family Institute for Breast Cancer Research at Princess Margaret Hospital.

Dr. Boyd initially verified breast density (mammographic density, or MD) as a strong risk factor for breast cancer in middle aged and older women in a landmark study published in the *New England Journal of Medicine* in 2007. Until now, little was known about the development of breast density in early life, or how it relates to a young woman's height, weight and age, and the breast density of their mothers.

The findings of the current study indicate that risk assessment using less harmful techniques such as magnetic resonance imaging (MRI) instead of X-ray should start much earlier in life.

Says Dr. Boyd: "It is known that the breast is most susceptible to the effects of carcinogens at early ages. Our findings suggest that differences in breast tissue composition in early life may be a potential

mechanism for this increased susceptibility. By identifying the environmental and genetic factors that influence breast tissue composition in early life we may be able to develop safe and effective methods of prevention."

In this study, between 2003-2006, the researchers recruited 400 mother-daughter pairs and used MRI to examine [breast tissue](#) in daughters, aged 15-30-years, and a random sample of 100 of the mothers. In the young women, MRI was used to measure breast water concentration to avoid exposure to radiation from mammograms. Blood was obtained from each woman within 10 days of the start of the most recent menstrual period. Mothers underwent mammography and a random sample of 100 also consented to have a breast MRI.

Results show that percent breast water variation is higher in 15-19 year olds than in 20-30 year olds, and decreases with age, as backed by analysis of the 100 mother-daughter pairs who both had MRI.

The researchers found that in mothers, percent breast water as measured by MRI was strongly linked with percentage of mammographic density. Percent breast water in daughters (median 45%) was significantly higher than in mothers (28%), and decreases as their age and weight increases, but increases with increasing height. It was also linked to increasing MD in their mothers. Weight, height, and the mothers MD are known risk factors for [breast cancer](#).

Higher blood growth hormone concentrations were also linked to higher percent breast water. Results showed that each 5cm difference in height in daughters was associated with 3% increase in percent [breast](#) water, which suggests a mechanism by which growth might affect the risk of cancer.

Source: University Health Network

Citation: Mother-daughter breast density study points way to earlier cancer risk assessment (2009, April 30) retrieved 10 April 2024 from <https://medicalxpress.com/news/2009-04-mother-daughter-breast-density-earlier-cancer.html>

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