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Breast cancer risk assessment: How risk models can "overdiagnose" risk

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Background: Overdiagnosis is commonly defined as a diagnosis of "disease" which will never cause symptoms or death during a patient's lifetime. Similarly, overdiagnosis can also happen when individuals are given the diagnosis of being at risk for a disease, such as being at high-risk for developing breast cancer. Women can be given such a diagnosis by meeting a set of risk assessment criteria, which are often accompanied by recommended management strategies. We sought to identify the extent and consequences of overdiagnosis for individuals being at high risk for breast cancer using the American Cancer Society (ACS) guidelines for the appropriate use of Magnetic Resonance Imaging (MRI).

Methods: We identified women who fit the ACS criteria in a population based sample at a community hospital. The ACS criteria mentions three risk assessment models for determining a woman's risk, and these criteria were reviewed to determine the extent of possible overdiagnosis in this population. The expected resource utilization resulting from this overdiagnosis, and the impact on patient quality of life are extrapolated.

Results: 5,894 women who received mammography screening at the study site were included. 342 (5.8%) of the women were diagnosed as high risk by at least one model. However, only 0.2% of the total study population were diagnosed as high risk by all three models. One model identified 330 (5.6%) to be at high risk, while the other two models identified many fewer eligible women (25, 0.4% and 54, 0.9% respectively).

Conclusions: Using different models to evaluation the ACS criteria identifies very different populations, implying a large potential for overdiagnosis. Further, this overdiagnosis is likely to result in the outcome of screening too many women, incurring false positives and unnecessary resource utilization.

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