Is Risk Stratification for Breast Cancer Screening Methodologically Feasible?

Fletcher SW
Boston MA, USA

Background: In 2004 the Institute of Medicine of the U.S. National Academies published a report, *Saving Women's Lives – Strategies for Improving Breast Cancer Detection and Diagnosis.* A major recommendation was to develop tools to identify women who would benefit most from breast cancer screening, based on individually tailored risk prediction techniques. This talk examines what is known about risk stratification for breast cancer and the statistical and epidemiologic issues encountered when applying risk stratification to breast cancer screening.

Methods: A literature review of the breast cancer prediction tool developed by Gail et al at the U.S. National Cancer Institute was undertaken to determine the tool's ability to predict breast cancer occurrence, for both calibration and discrimination.

Results: Few studies have been conducted. Those reporting on the validity of the Gail model found calibration high. One study reporting both calibration and discrimination found calibration high but discrimination little better than chance (concordance statistic = = .58). Estimates for young women with genetic mutations for breast cancer suggest much better discrimination.

Discussion: Risk stratification for breast cancer development in the general population presently works well at the population level but poorly at the individual level. The low prevalence of breast cancer in the general population and the small relative risks for most breast cancer risk factors and the fact that many factors are spread out over the population may be insurmountable problems in using risk stratification techniques when screening decisions are made for individual women. Young women with genetic mutations for breast cancer may be an exception.

Literature:

1. Fletcher SW. Risk stratification for breast cancer detection. In Herdman R, Norton L, eds. Saving women's lives - Strategies for improving breast cancer detection and diagnosis. A Breast Cancer Research Foundation and Institute of Medicine Symposium. Washington DC, The National Academies Press, 2005:43-50.
2. Rockhill B, Spiegelman D, Byrne C, Hunter DJ, Colditz GA. Validation of the Gail et al model of breast cancer risk prediction and implications for chemoprevention. J Natl Cancer Inst 2001;93:358-366.
3. Wald NJ, Hackshaw AK, Frost CD. When can a risk factor be used as a worthwhile screening test? BMJ 1999;319:1562-1565.