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Effect of Screening Mammography on Breast-Cancer Mortality in Norway

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ABSTRACT

BACKGROUND

A challenge in quantifying the effect of screening mammography on breast-cancer mortality is to provide valid comparison groups. The use of historical control subjects does not take into account chronologic trends associated with advances in breast-cancer awareness and treatment.

METHODS

The Norwegian breast-cancer screening program was started in 1996 and expanded geographically during the subsequent 9 years. Women between the ages of 50 and 69 years were offered screening mammography every 2 years. We compared the incidence-based rates of death from breast cancer in four groups: two groups of women who from 1996 through 2005 were living in counties with screening (screening group) or without screening (nonscreening group); and two historical-comparison groups that from 1986 through 1995 mirrored the current groups.

RESULTS

We analyzed data from 40,075 women with breast cancer. The rate of death was reduced by 7.2 deaths per 100,000 person-years in the screening group as compared with the historical screening group (rate ratio, 0.72; 95% confidence interval [CI], 0.63 to 0.81) and by 4.8 deaths per 100,000 person-years in the nonscreening group as compared with the historical nonscreening group (rate ratio, 0.82; 95% CI, 0.71 to 0.93; $P < 0.001$ for both comparisons), for a relative reduction in mortality of 10% in the screening group ($P = 0.13$). Thus, the difference in the reduction in mortality between the current and historical groups that could be attributed to screening alone was 2.4 deaths per 100,000 person-years, or a third of the total reduction of 7.2 deaths.

CONCLUSIONS

The availability of screening mammography was associated with a reduction in the rate of death from breast cancer, but the screening itself accounted for only about a third of the total reduction. (Funded by the Cancer Registry of Norway and the Research Council of Norway.)

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An Investigation of the Apparent Breast Cancer Epidemic in France: Screening and incidence trends in birth cohorts

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Abstract

Background: Official descriptive data from France showed a strong increase in breast-cancer incidence between 1980 to 2005 without a corresponding change in breast-cancer mortality. This study quantifies the part of incidence increase due to secular changes in risk factor exposure and in overdiagnosis due to organised or opportunistic screening. Overdiagnosis was defined as non progressive tumours diagnosed as cancer at histology or progressive cancer that would remain asymptomatic until time of death for another cause.

Methods : Comparison between age-matched cohorts from 1980 to 2005. All women residing in France and born 1911-1915, 1926-1930 and 1941-1945 are included. Sources are official data sets and published French reports on screening by mammography, age and time specific breast-cancer incidence and mortality, hormone replacement therapy, alcohol and obesity. Outcome measures include breast-cancer incidence differences adjusted for changes in risk factor distributions between pairs of age-matched cohorts who had experienced different levels of screening intensity.

Results: There was an 8-fold increase in the number of mammography machines operating in France between 1980 and 2000. Opportunistic and organised screening increased over time. In comparison to age-matched cohorts born 15 years earlier, recent cohorts had adjusted incidence proportion over 11 years that were 76% higher [95% confidence limits (CL) 67%, 85%] for women aged 50 to 64 years and 23% higher [95% CL 15%, 31%] for women aged 65 to 79 years. Given that mortality did not change correspondingly, this increase in adjusted 11 year incidence proportion was considered as an estimate of overdiagnosis.

Conclusions: Breast cancer may be overdiagnosed because screening increases diagnosis of slowly progressing non-life threatening cancer and increases misdiagnosis among women without progressive cancer. We suggest that these effects could largely explain the reported “epidemic” of breast cancer in France. Better predictive classification of tumours is needed in order to avoid unnecessary cancer diagnoses and subsequent procedures.