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Interval cancers in the Scottish screening programme

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Introduction

Interval cancers are an important measure of screening effectiveness because they reflect screening sensitivity. Interval cancer rates published previously by two regional programmes exceeded national targets based on Swedish two-county performance.

Aims

To present interval cancer rates for the Scottish programme and to investigate methods for their optimum ascertainment.

Comments

High interval cancer rates are an issue which must be addressed during breast cancer screening. The high rates reported in Scotland supplement those reported elsewhere in the UK, indicating the generality of the problem. This paper discusses the accurate calculation of interval cancer rates which is essential for accurate programme evaluation and interprogramme comparison. The high rate reported for previous assessment of interval cancer cases is not isolated and raises important questions concerning the reason for the delayed diagnosis.

Methods

Interval cancers were identified in women screened by the Scottish programme between April 1991 and March 1995. Screening was by single view mammography with dual reading, every three years. Cases were identified by record linkage of cancer registry and screening unit databases with manual

verification. Interval cases were defined as confirmed primary invasive breast cancers occurring within three years of a negative screen. Cancers expected in the absence of screening were estimated by applying incidence rates projected for 1991 (obtained by linear projection of age specific rates obtained 1978-1987) to woman years at risk. These were calculated by five methods:

1: using actual numbers of women screened as denominators

2: adjusting for withdrawals due to diagnosis of breast cancer or early rescreening but only at 1, 2 or 3 years after a negative screen

3: calculating actual time at risk from individuals? screening history

4 and 5: using age-period Poisson regression modelling to estimate expected underlying incidence by age group and year, allowing for increasing incidence due to ageing and based on women years at risk predicted by methods 2 (method 4) and 3 (method 5).

Results

In 390,907 women screened during 1991-1995, 817 interval cases arose, with 185, 373 and 259 cases presenting in years 1, 2 and 3, respectively, after a negative screen (follow up is not yet complete). Of all intervals, 16% had previously been assessed for a suspicious abnormality. Overall cancer detection rate was 47.8 per 10,000 women screened, with 26% measuring < 10mm. Where follow up was complete, interval cancer rates were 4.8, 12.1 and 12.1 cancers per 10,000 women screened in years 1, 2 and 3 following a negative screen (23, 60 and 59% proportionate incidence based on underlying incidence of 20.3 per 10,000 screened). Data for the third year are based on one screening year only (1991-1992).

Rates were similar to those published for East Anglia and the North West for years 1 and 2 but were lower for the third year; all exceeded the national target (<12 per 10,000 women screened, in years 1 and 2). Comparison of methods revealed greatest differences for the third year. Using actual time at risk (methods 3 and 5) decreased women years by 9%, compared with method 1, resulting in estimation of slightly higher interval cancer rates. Method 3 predicted highest proportionate incidences (22.9, 58.4 and 66.5% for years 1, 2 and 3). Methods 4 and 5 predicted underlying incidence rates of 20.3, 20.9 and 21.5 per 10,000 women for years 1, 2 and 3 after screening compared with 20.3 per 10,000 women obtained by linear extrapolation.

Discussion

Interval cancer rates in the Scottish programme are similar to those published for other UK regions for the first two years following a negative screen but are lower in the third year; however due to wide confidence intervals the difference is not significant due to wide confidence intervals. Rates would be expected to rise each year until rescreening. Explanations for this lower rate include the following:

firstly, shortage of data (third year rate is based on one year of screening with complete follow up); secondly, under-reporting due to incorrect classification of cancers which presented in women before the rescreening date and which were not diagnosed until after reinvitation for screening after self-referral (and thus apparent refusal for rescreening); and thirdly, under-reporting due to women presenting shortly before the assigned rescreening date but who were waiting for formal diagnosis at rescreening (this might be the case if Scottish women were less 'breast aware'). Two view mammography, introduced in 1995, will hopefully lower rates. Dual reading, which is known to increase screening sensitivity, has always been performed. Further work on assessed interval cancers and on radiological and pathological characteristics of false negatives is required to determine the cause of suboptimal sensitivity.

References

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