

Breast cancers missed in the prevalent screening round: effect upon the size distribution of incident round detected cancers

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Abstract

Objective—To determine the effect of false negative screens (missed cancers) in the prevalent screening round on the relative size distribution of cancers detected at the first incident screen.

Setting—The Bolton, Bury, and Rochdale breast screening programme.

Methods—One hundred and three breast cancers detected in the first incident round of screening were analysed. The previous (prevalent round) screening films taken between two and four years earlier were subjected to blinded review and classified as either true negatives (no significant abnormality visible) or false negatives (a suspicious abnormality visible at the site of the subsequently detected cancer). The pathological size, type, and grade (where appropriate) of the cancers were recorded.

Results—Fifty one of the 103 cancers (49%) detected in the first incident round screen measured <15 mm in diameter. A total of 32 cases were classified as false negatives. Of these, 12 (38%) measured <15 mm in diameter. If all the false negative cancers had been detected at the prevalent screen, 39 (55%) of the remaining 71 cancers detected in the first incident round screen would have measured <15 mm. A relative excess of lobular carcinomas was found among the false negatives.

Conclusions—The findings suggest that although false negative screens in the prevalent round increase the number of cancers available for detection at the first incident round screen, many of these cancers are still <15 mm in diameter at detection. Cancer detection performance in the prevalent screening round has only a minor influence on the relative proportion of small and large cancers detected at the first incident round screen.

(J Med Screen 1999;6:28-29)

Keywords: breast cancer, mammography

Analysis of recent detection rates for invasive cancers in the UK breast screening programme (in the form of standardised detection ratios—SDRs) has suggested that local programmes with low detection rates in the prevalent (first) screening round can expect to have relatively high detection rates in the incident (second and subsequent) screening round. This is because some of the missed cancers do not

present as interval cancers and are therefore still present (and are more easily detected) at the subsequent screen.¹ It might also be expected that the cancers missed at the prevalent screen would be larger at detection than cancers arising between screens, and that this effect would alter the distribution of small and large incident screen detected cancers. This study was designed to investigate the effect of missed prevalent screen cancers on the relative distribution of small (<15 mm) and large (\geq 15 mm) cancers at the first incident screen.

Materials and methods

One hundred and sixteen invasive cancers were detected in the second round of screening (that is, the first incident round) of the Bolton, Bury, and Rochdale breast screening programme before 1 August 1998. Of these, 103 met the following criteria for inclusion in the study: interval between screens of two to four years; technically adequate and available screening films; and availability of full pathological information. Cancers diagnosed as a result of early recall for reassessment were excluded. The cases had been screened over a period in excess of 10 years, dating back to early 1988.

The prevalent round films for each case were reviewed by an experienced breast radiologist. The reader was aware that a cancer had subsequently developed in each case, but was unaware of the side or site. The prevalent round films were viewed and classified initially without the incident round films—the latter were only viewed later to confirm that a perceived abnormality was indeed at the site of the cancer. The cases were classified as either true negative (no significant abnormality perceived at the site of the subsequently detected cancer) or false negative (an uncertain or suspicious abnormality at the site of the subsequently detected cancer, considered to require further assessment). The pathological type and grade (where appropriate) of the tumours was recorded together with the size of the invasive tumour as stated on the pathology report.

Results

Thirty two of the 103 cases reviewed (31%) were classified as false negatives. Table 1 shows the types and size distribution of cancers detected and the proportion of each type that were false negative.

Fifty four of the cases were first screened before April 1992—21 (39%) of these were classified as false negative. Of the 49 cases first screened after April 1992, 11 (22%) were classified as false negative.

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Accepted for publication
15 December 1998

Table 1 Distribution of cancers by type and size and the numbers classified as false negative screens in the prevalent round

Type	All cases		False negatives		% Of each type classified as false negative (all sizes)
	All sizes	<15 mm	All sizes	<15 mm	
IDC* grade I	16	8	5	2	31.2
IDC grade II	34	14	12	2	35.3
IDC grade III	28	13	5	2	17.9
Lobular	8	5	6	4	75.0
Other	17	11	4	2	23.5
Total	103	51	32	12	31

*IDC=invasive ductal carcinoma.

Discussion

Three retrospective reviews of cancers detected in the incident round in the UK breast screening programme have recently been published,²⁻⁴ which give false negative rates for the prevalent round screens of between 13% and 26%. There is, however, no consistent definition of a false negative in these papers. In this study the prevalent round films were read in such a manner that the likelihood of a subtle abnormality being detected was maximised, in that the reader was aware that a cancer had subsequently developed in each case. It is noteworthy that the false negative rate for women first screened before April 1992 (39%) was almost double that for women screened after that date (22%). This is in keeping with the progressive improvement in performance of many screening units.

A target stating that at least 50% of invasive cancers should measure <15 mm in diameter has been set for the UK breast screening programme,³ and most programmes now reach or exceed this target. The findings of this study indicate that even if there were no false negative screens in the prevalent round then the proportion of incident round cancers

measuring <15 mm would only rise by 5.4%, to 54.9%. This is because 12 of the 32 false negative cancers are still <15 mm in diameter at detection, most being relatively slow growing types (these included two grade I invasive ductal carcinomas, one tubular carcinoma, one tubulolobular carcinoma, and four lobular carcinomas). Many of the more aggressive tumours that were missed at the prevalent screen will have presented as interval cancers.

The excess of lobular cancers classified as false negative in the prevalent round is unsurprising in view of the subtlety of the mammographic signs that many of these tumours exhibit. Similarly, the low incidence of grade III invasive ductal carcinomas among the false negatives is to be expected—most false negative grade III invasive ductal carcinomas will present as interval cancers rather than subsequent screen detected cancers because they grow quickly.

In conclusion, the proportion of small cancers detected in the first incident round (but not the absolute number) would appear to be primarily a function of detection performance in that round, and is little influenced by detection performance in the preceding round.

- 1 Blanks R. *SDR results for 1996/97*. Report from the Cancer Screening Evaluation Unit, Institute of Cancer Research, January 1998.
- 2 Wheatley DC, Yeoman LJ, Burrell H, *et al*. Mammographic and pathological features of breast cancer detected at first incident round screening. *The Breast* 1997;6:259-65.
- 3 Daly CA, Apthorp L, Field S. Second round cancers: how many were visible on the first round of the UK national breast screening programme, three years earlier? *Clin Radiol* 1998;53:25-8.
- 4 Duncan KA, Needham G, Gilbert FJ, *et al*. Incident round cancers: what lessons can we learn? *Clin Radiol* 1998;53:29-32.
- 5 NHS Breast Screening Radiologists Quality Assurance Committee. *Quality assurance guidelines for radiologists*. Sheffield: NHS Breast Screening Programme, No 15, 1997.