EUSOMA review of mammography screening

A. Hackshaw*

Cancer Research UK & UCL Cancer Trials Centre, University College London, London, UK

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In 1993 the European Society of Mastology concluded that regular mammography screening reduces the risk of dying from breast cancer. The evidence came from a meta-analysis of six randomised controlled trials that collectively showed a statistically significant 22% reduction in breast cancer mortality. The effect is clear in women aged ≥50 years but there is uncertainty in women aged <50 years. Screening programmes for women aged ≥50 years should be part of organised public health programmes. The adverse effects of screening were addressed and performance indicators of programmes were specified.

Key words: breast cancer, mammography, review, screening

Introduction

The European Society of Mastology (EUSOMA) convened a meeting of experts in 1993 to evaluate the value and potential hazards of breast cancer screening. Following the meeting a consensus report was published [1]. This is a summary of that report.

The effect of screening on breast cancer mortality

The effect of mammographic screening on breast cancer mortality was assessed by undertaking a meta-analysis of the results from the six randomised controlled trials [2–9] (details of which are given elsewhere in this publication). In these trials women were either offered a periodic mammographic examination or not. From each trial the relative risk of dying from breast cancer in women who were screened compared with the control women was obtained. The estimates were pooled by taking the average of the log relative risk and weighted by the inverse of its variance.

Two trials from Canada [10] were not included in the main analysis because they were not designed to investigate mammography alone and there was no unscreened control group. One trial was based on women aged 40–49 years and compared annual mammography plus physician examination with an initial physician examination. The other, based on women aged 50–59 years, compared annual mammography plus physician examination with annual physician examination.

All the trials showed a reduction in mortality. There is no evidence of heterogeneity (test for heterogeneity, P value 0.98) between the estimates, suggesting that the results were consistent with each other. This is reassuring, because the results came from different trials in different countries. Table 1 gives some details of the trials. In women aged 40–74 years there is a statistically significant 22% reduction in breast cancer mortality (95% CI 13–30). This is an underestimate, because not all women accepted the offer of screening in the trials (~78% accepted). The estimated reduction in mortality is 28% assuming 100% uptake.

There is a 24% reduction in breast cancer mortality (95% CI 13–33), again with no evidence of heterogeneity between the estimates (P value 0.86). If the Canadian trial [10] is included the pooled estimate is 22% (relative risk 0.78, 95% CI 0.69–0.88).

There is a non-statistically significant reduction of 15% (relative risk 0.85, 95% CI 0.68–1.08), with no evidence of heterogeneity between the estimates (P value 0.84). If the Canadian trial [10] is included the pooled estimate is 7% (relative risk 0.93, 95% CI 0.76–1.15).

When the EUSOMA report was published (1993) several of the trials were still in progress. Since then the results have been updated, but they do not differ materially from those published previously; the effect on the meta-analyses would therefore be small. In the overview of the four Swedish trials the relative risk of breast cancer mortality was 0.77 (95% CI 0.67–0.88) in 1993 [1] and 0.79 (95% CI 0.70–0.89) in 2002 [11]. In the trial from Edinburgh the relative risk was 0.85 (95% CI 0.65–1.12) in 1993 [1] and 0.87 (95% CI 0.70–1.06) in 1999 [12]. It is reassuring that the effect of mammography has remained consistent even after a longer follow-up in the trials.

The trials clearly show that periodic mammography reduces the risk of dying from breast cancer. Although analysing the data according to age (40–49 and 50–74 years) is somewhat arbitrary, there is a suggestion that screening women <50 years old may be less effective. The data from such women are, however, relatively sparse and so no firm conclusions could be made.

Translation of research results into practice and performance indicators

A number of indicators were accepted as being of recognised value in monitoring screening programmes and were obtained from

*Correspondence to: Dr A. Hackshaw, Cancer Research UK & UCL Cancer Trials Centre, University College London, Stephenson House, 158–160 N. Gower Street, London NW1 2ND, UK. Tel: +44-020-7679-8008; Fax: +44-020-7679-8001; E-mail: ah@ctc.ucl.ac.uk

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programmes in four European countries. Table 2 shows the early results from these national programmes and indicates, at that time, the extent to which screening programmes were on target. Even at this early stage the measures of performance from the programmes were similar to those from the randomised trials, so a similar reduction in mortality was expected.

### Adverse effects of screening

All screening is associated with adverse effects and the aim of a screening programme is to minimise these while at the same time maximising the benefits. The adverse effects were classified according to those arising from the screening process itself, the false-positives and overdiagnosis.

#### Screening process risks

Three psychological and physical factors were identified: (i) the anxiety associated with being invited for screening; (ii) the discomfort and pain associated with the examination itself (due to compression of the breast); and (iii) the risk of cancer induced by radiation exposure from mammography. There was little or no evidence to suggest that these were significant factors.

### False-positive results

A woman with a false-positive result does not have breast cancer but has an abnormal mammogram and is referred for further investigation. This will be associated with anxiety, particularly during the time between referral and when she is informed that she does not have breast cancer. Some of these women will also be referred for a biopsy, from which there will be further psychological morbidity, and pre-operative counselling may be required.

### Overdiagnosis

Overdiagnosis, in this context, is the detection of slow-growing non-lethal breast cancer. Such women will unnecessarily undergo...
screening, diagnosis and treatment. A related problem is when screening identifies cancers whose prognosis is unaltered (because it is already metastatic, or because it could be curable if left until symptoms develop). Such women live with the knowledge that they have cancer for longer than would otherwise be the case if they were not screened.

Although there were concerns over the adverse effects of screening, studies at that time have shown them to be infrequent or relatively minor. They are, however, a reason for implementing and maintaining quality assurance measures in screening programmes.

Conclusions and recommendations

Regular mammographic examination, followed by diagnosis and treatment (as required) leads to a significant 22% reduction in breast cancer mortality.

Screening women aged ≥50 years should be part of organised public health programmes with full quality control and monitoring.

There is uncertainty over the effect of screening in women aged <50 years. If such women request it they should have it performed but after being informed of the uncertainty and the possible consequences. The main research need specified in the EUSOMA report was to adequately assess the value of screening in this age group to resolve the issue.

The benefits of screening demonstrated by the trials can be translated into practice, but with appropriate quality assurance. Several performance indicators of recognised value were specified that could be used successfully on a national basis. The adverse effects of screening should be recognised.

References