Surveillance mammography for detecting ipsilateral breast tumour recurrence and metachronous contralateral breast cancer: a systematic review

Robertson C, Arcot Ragupathy SK, Boachie C, Fraser C, Heys SD, MacLennan G, Mowatt G, Thomas RE, Gilbert FJ, Mammographic Surveillance Health Technology Assessment Group

CRD summary

This review concluded that magnetic resonance imaging was better than surveillance mammography in diagnosing ipsilateral breast tumour recurrence and new contralateral breast cancer in women previously treated for primary breast cancer. This conclusion reflected the limited data available, but limitations in the search and study selection process might have resulted in relevant studies being missed.

Authors' objectives

To assess the diagnostic accuracy of surveillance mammography to detect same-side breast tumour recurrence and the occurrence of new opposite-side breast cancer, in women who had been treated for primary breast cancer.

Searching

MEDLINE, MEDLINE In-Process, EMBASE, BIOSIS Previews, Science Citation Index, CANCERLIT, Medion, Cochrane Database of Systematic Reviews, DARE, and HTA database were searched for items from 1990 to March 2009. Only studies published in English were included. Trials registries were searched for ongoing or recently completed studies. Relevant websites and the bibliographies of included studies were screened for additional articles.

Study selection

Randomised controlled trials (RCTs) of surveillance mammography (routine or non-routine) and diagnostic consecutive cohort studies of surveillance mammography or other comparator tests were eligible for inclusion. Comparator tests were ultrasound, magnetic resonance imaging (MRI), specialist-led clinical examination, and unstructured primary care follow-up, which was defined as the absence of formal routine secondary care follow-up, which might or might not involve mammography. Studies had to be conducted in women who had been treated for primary breast cancer without detectable metastatic disease at the time of initial presentation. They had to use histopathological assessment as the reference standard for test-positive patients and a period of follow-up for test-negative patients. They had to report the absolute numbers of true-positive, false-negative, false-positive, and true-negative results for the detection of breast cancer recurrence on the same side or new contralateral breast cancer.

Most of the included studies were conducted in Europe; two were conducted in South Korea. The median age of study participants was 53 years (range 22 to 82). The reported follow-up for test-negative patients ranged from five to 32 months.

The authors did not state how many reviewers selected studies for inclusion.

Assessment of study quality

The methodological quality of included studies was assessed using an adapted version of the Quality Assessment of Diagnostic Accuracy Studies tool (QUADAS; details not reported). Higher quality studies were those that included a representative patient spectrum, avoided partial and differential verification bias, and used blinded interpretation of test results.

Quality assessment was undertaken by one reviewer and independently checked by a second reviewer; any disagreements were resolved by discussion or arbitration by a third reviewer.

Data extraction

The data were extracted for sensitivity and specificity, for surveillance mammography and comparator tests, for the detection of ipsilateral recurrence and new contralateral cancer. Positive and negative likelihood ratios and diagnostic odds ratios, with 95% confidence intervals were calculated.

These data were extracted by one reviewer and independently checked by a second reviewer; any disagreements were

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resolved by discussion with or arbitration of a third reviewer.

Methods of synthesis
Studies were summarised in a narrative synthesis, by target condition (ipsilateral recurrence or new contralateral cancer) and surveillance type (routine or non-routine).

Results of the review
Nine studies, with 4,002 participants, were included in the review; 3,724 participants were included in the analyses. None of the included studies met the authors' definition of higher quality. For all but one it was unclear whether the time between a positive index text and histopathological confirmation was short enough to avoid disease progression bias. All studies were considered to have sufficient follow-up to confirm the negative results.

Routine surveillance: In two studies, the reported sensitivities for ipsilateral detection were 64% and 67% and the specificities were 97% and 85%. The reported sensitivities of MRI were 86% and 100%, and the specificities were not reported and 93%. The sensitivities of clinical examination were 50% and 89%, and the specificities were not reported and 76%. One study reported combined sensitivity and specificity estimates of 100% for surveillance mammography and 67% for clinical examination.

Non-routine surveillance: The sensitivities for ipsilateral detection ranged from 50% to 83% and the specificities ranged from 57% to 75% (three studies). For MRI, the sensitivities ranged from 93% to 100% and the specificities ranged from 88% to 96% (three studies). For ultrasound, the sensitivities were 43% and 87% and the specificities were 31% and 73% (two studies). For clinical examination, the sensitivities were 43% and 62% and the specificities were 56% and 49% (two studies).

Contralateral tumours: One study reported the performance of routine surveillance mammography for the detection of new contralateral tumour; the sensitivity was 67% and the specificity was 50%. For MRI, the sensitivities were 67% and 91% and the specificities were 50% and 90% (two studies). One study reported the performance of surveillance mammography and ultrasound combined (sensitivity 95% and specificity 99%). Another study reported surveillance mammography, clinical examination, and ultrasound combined (sensitivity 64% and specificity 84%) and surveillance mammography, clinical examination, ultrasound, and MRI combined (sensitivity 100% and specificity 89%). One study reported data for clinical examination alone (sensitivity zero and specificity 50%).

No study reported the accuracy of the tests for diagnosing new contralateral breast cancer in non-routine surveillance patients.

Authors' conclusions
MRI was better than surveillance mammography for diagnosing ipsilateral breast tumour recurrence and new contralateral breast cancer in previously treated women. The limited data mean that these results should be interpreted with caution.

CRD commentary
This review clearly stated its aim and reported full inclusion criteria. A number of sources were searched for relevant studies, but restricted to those in English, which raises the possibility of language bias and the omission of relevant studies. The methodological quality of included studies was assessed and the results were incorporated into the review results. The data extraction and quality assessment processes were designed to minimise error and bias, but it was not clear whether similar methods were applied for study selection. The use of a narrative synthesis was appropriate, given the apparent heterogeneity of the included studies.

The authors' conclusions reflected the data presented and they appropriately noted that the evidence was limited, but the limitations in the search and study selection process may have resulted in relevant studies being missed.

Implications of the review for practice and research
Practice: The authors did not specify any recommendations for clinical practice.

Research: The authors stated that further research was needed to assess the relative performance of surveillance tests in breast cancer. They stated that a definitive randomised controlled trial should be undertaken in women at higher risk of

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ipsilateral breast tumour recurrence or new contralateral breast cancer. This trial could compare different frequencies of testing and clinical follow-up, in various settings. High-quality, direct head-to-head studies could be undertaken comparing the diagnostic accuracy of tests in the surveillance population.

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Bibliographic details
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Other publications of related interest
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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract

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contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.

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