Meta-analysis of sentinel lymph node biopsy after preoperative chemotherapy in patients with breast cancer

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CRD summary
This review of 21 diagnostic test studies found that sentinel lymph node biopsy is an accurate technique for determining the need for axillary node dissection following pre-operative chemotherapy. Some details of the review process were missing but the authors’ conclusions seemed reasonable based on the data that they presented.

Authors’ objectives
To estimate the accuracy of sentinel lymph node biopsy (SLNB) after preoperative chemotherapy in women with breast cancer.

Searching
The following electronic databases were searched: MEDLINE (1993 to December 2004), EMBASE (2001 to June 2004), Cancerlit (1993 to October 2002) and Cochrane Central Register of Controlled Trials (inception to 2004). Search terms were reported. References from identified studies were checked for inclusion. No language restrictions were applied.

Study selection
Studies of patients with operable breast cancer who had undergone SLNB after preoperative chemotherapy and subsequent axillary node dissection during surgery to remove the primary tumour were eligible for inclusion in the review. Histological analysis of axillary node dissection was the reference standard. Studies of patients with inflammatory breast cancer who received only hormone treatment prior to the operation were excluded from the review.

The majority of patients in included studies had stage II breast cancer and were treated with combined anthracycline (doxorubicin or epirubicin) and cyclophosphamide as chemotherapy.

The authors do not state how studies were selected for inclusion in the review or how many reviewers were involved in selecting the studies.

Assessment of study quality
The authors state that validity of included studies was assessed using the criteria of the Centre for Evidence-Based Medicine. It is unclear which criteria were applied as they were not listed in the paper.

Two reviewers applied the validity assessment criteria. The authors did not state how disagreements were resolved.

Data extraction
Data extracted from included studies were used to construct two by two tables.

Identification rate (IR), sensitivity, false negative rate, negative predictive value and accuracy were calculated. It was assumed that there were no false positives. Study authors were contacted for missing data where required.

The authors did not state how many reviewers performed the data extraction.

Methods of synthesis
Pooled sensitivity, pooled negative predictive values and overall accuracy were calculated.

95% confidence intervals (CIs) were calculated using Diamond’s approximation. Statistical tests for homogeneity were
applied although the authors did not state which tests were used.

Bayesian hierarchical methods were used to perform meta-analyses, incorporating medical centres in the model. Overall IRs and sensitivity were calculated with a 95% credible interval (CrI).

Funnel plots were constructed to test for publication bias.

Results of the review
Twenty one studies were included in the review (n=1,273). The authors stated that all 21 studies were level IIb evidence exploratory cohort studies with good reference standards. Five studies included a comparison group of women who had not received preoperative chemotherapy.

Pooled IR was 90% (95% CI: 88, 91). Significant heterogeneity was noted in the result (p<0.001). IRs were found to be lower when ‘mixed’ sentinel node biopsy techniques were used (pooled IR 87%, 95% CI: 85, 90) and higher when dye and/or isotope techniques were used (pooled IR ranged from 92% to 95%). In the five comparative studies, there was no statistically significant difference in pooled IR between those who received preoperative chemotherapy and those who did not. The Bayesian model estimated pooled IR as 91% (95% CrI: 88, 94).

Pooled sensitivity was 88% (95% CI: 85, 90). The authors did not report whether there was any heterogeneity in the result. In the five comparative studies, there was no statistically significant difference in pooled sensitivity between those who received preoperative chemotherapy and those who did not. The Bayesian model also estimated pooled sensitivity as 88% (95% CI: 84, 91).

Pooled negative predictive value was 90% (95% CI not reported). The authors did not report whether there was any heterogeneity in the result.

Pooled overall accuracy was 94% (95% CI not reported). The authors did not report whether there was any heterogeneity in the result.

Funnel plots for IR and sensitivity indicated no publication bias.

Authors’ conclusions
The authors stated that ‘SLNB appears to be an accurate technique for determining the need for axillary treatment in patients who are clinically node-negative following pre-operative chemotherapy’.

CRD commentary
This review addressed a clear question using specified inclusion criteria. The literature search seems to have been comprehensive. No language restrictions applied and the test for publication bias was negative, making it unlikely that relevant studies were missed. Included studies were assessed as being of a high standard.

The authors did not specify which validity assessment criteria were used and did not report the full results of the validity assessment for all included studies. Details of data transformations and analysis appear to be adequate. The decision to pool the data in a meta-analysis seems to have been appropriate based on the data presented. A test for heterogeneity was applied to the pooled IR but not to other measures. The authors did not specify which test was used. Heterogeneity was noted in the result and was explored appropriately.

The authors did not state how many reviewers were involved in selecting studies or extracting data, so it is possible that bias may have arisen at these stages.

The authors’ conclusions are likely to be reliable based on the data presented.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice beyond their conclusions.
Research: The authors state that the distributions generated by the Bayesian modelling could potentially be included in future decision analytical models for determining the cost and effectiveness of various treatment strategies.

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