Immediate biopsy versus observation for abnormal findings on mammograms: an analysis of potential outcomes and costs

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Needle localised biopsy for abnormal mammograms in breast cancer screening.

Type of intervention
Screening and diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
The study population consisted of women with suspicious findings on mammograms.

Setting
Hospital. The economic study was conducted in Kentucky, USA.

Dates to which data relate
Effectiveness data were derived from previous studies conducted between 1988 and 1994. Cost data related to studies conducted between 1988 and 1993. The price year was not stated.

Source of effectiveness data
Data were based on a review/synthesis of previously completed studies and estimates made by the authors.

Modelling
A decision tree of potential outcomes and costs (for six months) was constructed.

Outcomes assessed in the review
The primary health outcomes used in the analysis were: life expectancy after treatment, short term morbidity from treatment (i.e. complications from the treatment from which the patient will completely recover), and tumour doubling rate.

Study designs and other criteria for inclusion in the review
Not stated.
Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
17 studies were included.

Methods of combining primary studies
The authors chose the average of data found in the literature.

Investigation of differences between primary studies
Not stated.

Results of the review
The average life expectancy after treatment was the same as natural life expectancy at stage 0 (in-situ lesions), 15 years at stage 1 (T1 N0) and 8 years at stage 2 (T1 N1). Tumour doubling time was found to be 15% for short tumour-doubling time (will increase disease to stage 2) and 85% for long-tumour doubling time (i.e. will not change stage of disease). Complications due to biopsy were assumed to be such things as wound infection which would create morbidity for a period of 2 weeks. Along with the assumptions of the study these formed the effectiveness inputs to the decision tree.

Methods used to derive estimates of effectiveness
The authors made additional assumptions related to effectiveness which were used as inputs to the decision tree.

Estimates of effectiveness and key assumptions
The assumptions made for the decision tree inputs were that women aged between 30 to 69 years will naturally live to age 80, those aged between 70 to 79 will live an additional 15 years, and those aged above 80 will live an additional 10 years. The study also assumed that repeat mammograms would be carried out every six months. The study also made assumptions about the distribution of malignancies, average life expectancy after treatment, and tumour doubling times.

Measure of benefits used in the economic analysis
The measure of benefit was the Quality Adjusted Life Expectancy (QALE).

Direct costs
Direct costs included were: mammogram costs, biopsy costs, biopsy complication treatment, treatment of malignant disease at stage 0, stage 1 and stage 2. Discounting was not applied. The price year was not stated.

Statistical analysis of costs
Not stated.
Indirect Costs
Not stated.

Currency
US dollars ($).

Sensitivity analysis
One-way sensitivity analyses were carried out on aspects such as short tumour doubling time/QALE, short doubling time/cost, percentage of follow-up mammograms requiring biopsy/QALE, percentage of follow-up mammograms requiring biopsy/cost, Quality Multiplier/QALE and age of patient/QALE in order to take account of the variability in the data.

Estimated benefits used in the economic analysis
The study found that, depending on the assumptions made on tumour doubling time, the quality adjusted life expectancy (QALE) for an average 50 year old was longer for immediate biopsy by 0-3 years. QALE for an immediate biopsy for a 50 year old woman was 26.88 years and her QALE for 6 month observation was 26.15 years. Immediate biopsy also produced higher QALE when more than 30% of follow up mammograms required biopsy. Age did not affect the results.

Cost results
The estimated cost for immediate biopsy for a 50 year old woman was $2,759 and the cost for a 6 month observation was $1,924.

Synthesis of costs and benefits
No synthesis of costs and benefits was undertaken by the authors. An incremental analysis was not performed.

Authors’ conclusions
Lesions with a greater than 20% to 30% probability of being malignant, or lesions with potentially short doubling times, should undergo immediate biopsy. Those judged to be at a lower risk may be observed for six months. Either of these recommendations should be adjusted depending on the individual patient's quality of life concerns.

CRD COMMENTARY - Selection of comparators
The choice of comparators was clear.

Validity of estimate of measure of benefit
The use of a QALE was likely to be internally valid and the data have not been used selectively to prove a particular point. However, the assumptions made regarding the demographic details of the patients were not fully explained but were merely stated to be the average values.

Validity of estimate of costs
Costs were derived from previous studies but it was not clear how differing years of costs were averaged out. This is also relevant as the price year was not given.

Other issues
Details concerning decision tree construction were not given, however, good quality sensitivity analyses results were provided. Justification for the choice of a hypothetical patient of 50 years of age was not given and may relate to either the mean or median age of patient.

Source of funding
None stated.

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