Mammographically detected breast cancer: benefits of stereotactic core versus wire localization biopsy


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
Stereotactic core needle biopsy and needle localization surgical biopsy.

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
Patients with invasive breast cancer diagnosed by SCNBx or NLBx. The median age of the SCNBx group was 66 years (range: 50 - 86) which was statistically significantly different (p<0.05) from the NLBx group, median age 57 (range: 37 - 82).

Setting
The setting was one hospital in Missouri, USA and the economic study was carried out in the United States.

Dates to which data relate
Effectiveness data were based on patients diagnosed with invasive breast cancer by SCNBx during the period December 1993-September 1995 and on patients diagnosed with invasive breast cancer by NLBx during the period May 1993-May 1995. Resource use data were based on the same period and covered biopsy and definitive therapy. The price date was not stated.

Source of effectiveness data
The evidence for final outcomes was derived from a single study.

Link between effectiveness and cost data
The costing was undertaken retrospectively (after the effectiveness results were known) on the same patient sample as that used in the effectiveness study.

Study sample
The hospital records of 52 consecutive patients with invasive breast cancer diagnosed by SCNBx (n=21) or NLBx (n=31) over 2 years were reviewed retrospectively. Patients with ductal carcinoma in situ (DCIS) were excluded. Power calculations were not used to determine the sample size.
Study design
A retrospective cohort study with observations from a single centre. No follow-up of the patients was undertaken.

Analysis of effectiveness
The main outcome measures were surgical margins after first excision and the number of re-excisions and axillary dissections only in patients undergoing breast conservation.

Effectiveness results
All SCNBx and NLBx results were correct in the diagnosis of invasive breast cancer. There was one discrepancy in the SCNBx group. At the time of excision, surgical margins were statistically more frequently positive in patients who received NLBx (55%) than in patients who received SCNBx (0%). Furthermore, the distance of the tumour from the surgical margin for patients in the SCNBx group was greater as a whole than the distance for patients in the NLBx group in whom margins were negative and the distance was specified. Patients in the NLBx group undergoing breast conservation surgery also required re-excision more frequently (74%) than did those in the SCNBx group (0%).

Clinical conclusions
There appear to be advantages in using the SCNBx to diagnose nonpalpable breast cancer. There was a substantial and statistically significant improvement in the surgical margins achieved when the diagnosis of breast cancer was known before operation, and the need for re-excision of breast parenchyma as a part of breast conservation was eliminated. Most patients required only one trip to the operating room for their definitive operation rather than separate trips for the biopsy and the definitive procedure.

Measure of benefits used in the economic analysis
No single measure of effectiveness was derived. The set of measures used described the clinical course for the groups of patients after alternative diagnostic strategies. These were intermediate outcomes and hence were not directly suited to use for economic evaluation.

Direct costs
Episode-of-care resource consumption data for biopsy and definitive therapy were extracted from the hospital’s billing system database. Figures for selected cost centres (such as radiology, anaesthesiology and operating room) were recorded separately and analysed in addition to the total cost for the episode of care. Preoperative tests were included. Professional fees and outpatient visit costs were not included. The cost boundary of the hospital was adopted in estimation.

Statistical analysis of costs
Cost were treated as stochastic. Median cost per patient and the range was reported. The difference in medians were tested for statistical significance using Mann-Whitney U test.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
No benefits were included in the economic analysis.
Cost results
The median cost of SCNBx was $549 (range: $484 - 670) and the median cost of NLBx was $1,570 (range: $1,018 - 2,099). The median cost of each of the diagnostic procedures plus breast conservation was $3,861 for SCNBx and $5,030 for NLBx and for the diagnostic procedure plus mastectomy $4,189 and $6,053 respectively. The authors reported that, had professional fees been included in the cost analysis, the cost difference would be greater because NLBx would have included additional anaesthesia and surgical professional fees. In the breakdown of costs, the large cost advantage seen in operating room, anaesthesia and recovery room costs was somewhat reduced by the cost disadvantage seen in radiology and surgical pathology costs, but remained a significant advantage overall. The median cost was approximately $1,000 less than the median cost of NLBx (statistically significant p<0.0001). This cost difference was carried through the definitive procedure regardless of whether breast conservation or mastectomy followed the diagnosis.

Synthesis of costs and benefits
Costs and benefits were not combined.

Authors’ conclusions
This study has shown that diagnosing breast cancer by SCNBx rather than by NLBx has advantages to the patient by decreasing the need for trips to the operating room, decreasing the incidence of positive margins at breast tumour excision, decreasing the need for breast parenchyma re-excision for breast conservation, and decreasing the cost of patient management by approximately $1,000 per patient. The SCNBx should be used as the initial diagnostic procedure for women with indeterminate or high-suspicion lesions on mammogram. Careful attention must be paid to the technical aspects of SCNBx and the interpretation of some specific histopathologic results to ensure optimal patient management.

CRD COMMENTARY - Selection of comparators
A justification was given for the comparators used: (1) NLBx is considered as "gold standard" and (2) SCNBx was stated to be becoming accepted as an alternative to NLBX for diagnosis in many circumstances. You, as a user of this database, should consider whether these are widely used technologies in your setting.

Validity of estimate of measure of benefit
The effectiveness evidence was based on a small non-randomised retrospective study, which imposes a potential bias due to uncontrolled differences in the patient groups studied. Only intermediate indicators of the clinical course of patients were analysed, and therefore the study does not provide evidence of benefits in terms of final health outcomes to patients.

Validity of estimate of costs
The costs and resource quantities were not reported separately, although the breakdown into the selected costs centres were provided. Neither the details of the costing methods nor the price date were reported. Professional fees and outpatient clinic visits were not included.

Other issues
The authors’ conclusions may not be fully justified. There are potential problems related to the study design and uncertainties related to the small data set. The results achieved in a single institution with highly qualified professionals experienced in using the new technology, are not likely to be generalisable to other settings. More generally, decisions on the changes in recommended diagnostic procedures should be made by considering the improvement in final health outcomes to patients. Since no sensitivity analysis was undertaken on the potential variability in clinical course, it was not possible to assess whether estimated cost savings are likely to appear in other settings as well.
Source of funding
None stated.

Bibliographic details

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Other publications of related interest

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