Cost-effectiveness of ultrasound-guided liver biopsy
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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
Ultrasound-guided liver biopsy.

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
Patients (hypothetical) who would be considered for an outpatient percutaneous liver biopsy.

Setting
Hospital setting. The study was carried out in the USA.

Dates to which data relate
Effectiveness data were collected from studies previously published between 1952 and 1996. The price year was not stated.

Source of effectiveness data
Effectiveness data were derived from a review of previously published studies.

Modelling
A decision tree was constructed to compare a strategy of liver biopsy with ultrasonography versus a strategy without ultrasonography.

Outcomes assessed in the review
The outcomes assessed included the rate of minor complications (such as pain requiring analgesics) and major complications (requiring hospitalisation), and the proportion of patients with minor complications requiring outpatient treatment.

Study designs and other criteria for inclusion in the review
The estimates were based on data from one randomised controlled trial and a review of other studies. No inclusion or exclusion criteria were stated.
Sources searched to identify primary studies
The authors carried out a MEDLINE search of published literature and a review of references of published articles.

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
Approximately 17 studies were included.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not stated.

Results of the review
The probability of developing major complications was 1% (range: 0.25 - 2%) for ultrasound biopsy and 2% (range: 0.5 - 5%) for blind biopsy. The probability of developing minor complications was 37% (range: 5 - 50%) for ultrasound biopsy and 50% (range: 5 - 50%) for blind biopsy. 10% (range: 5-20%) of patients with minor complications required outpatient treatment, irrespective of the type of biopsy. 90% of patients who develop minor complications were to be treated with over-the-counter analgesics, irrespective of the type of biopsy. These data were used as inputs to the model.

Measure of benefits used in the economic analysis
The measure of benefit used was the reduction in major complications in patients.

Direct costs
Costs were not discounted given the short time frame of the study (less than 1 year). Quantities and costs were not reported separately. The direct costs included the costs of liver biopsy, biopsy complications and treatment. The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. Costs were based on Diagnosis Related Groups (DRGs) reimbursement data and Medicare charge data. The price year was not stated.

Statistical analysis of costs
Not reported.

Indirect Costs
Indirect costs such as travel expenses, lost wages, and other opportunity costs were not included.

Currency
US dollars ($).
Sensitivity analysis
A sensitivity analysis was conducted on the following parameters: frequency of major complications, percentage reduction in major complications, and costs of procedure.

Estimated benefits used in the economic analysis
The total number of major complications per 1000 patients was 20 for blind biopsy and 8 for ultrasound biopsy. The total number of minor complications per 1000 patients was 500 for blind biopsy and 370 for ultrasound biopsy. In the best, intermediate and worst-case scenarios the frequency of major complications with blind biopsy was 3%, 2% and 1% respectively. The percent reduction of major complications by ultrasound was 75%, 60% and 45% for the above categories. The marginal effectiveness expressed as the number of major complications avoided was 1.2/100 liver biopsies.

Cost results
The cost of major complications per 1000 patients was $100,000 for blind biopsy and $40,000 for ultrasound biopsy. The cost of minor complications per 1000 patients was $28,900 for blind biopsy and $21,675 for ultrasound biopsy. The total cost per strategy for 1000 patients was $500,900 for blind biopsy and $533,675 for ultrasound biopsy.

Synthesis of costs and benefits
The marginal cost per major complication prevented was $2,731. The model was most sensitive to the frequency of major complications and the cost of ultrasonography.

Authors’ conclusions
The decision analysis suggests that ultrasound-guided liver biopsy is cost-effective.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparator was clear.

Validity of estimate of measure of effectiveness
The authors acknowledged that the effectiveness results should be interpreted with caution. Firstly, the clinical data supporting the efficacy of ultrasonography were limited. Secondly, the efficacy of ultrasonography observed in randomised studies may be different from its efficacy in clinical practice. Thirdly, the efficacy of ultrasound-guided liver biopsy can vary from one institution to another. The authors did not make quality adjustments. In the literature, it was reported that ultrasound-guided liver biopsy relieves anxiety and apprehension associated with liver biopsy. The authors did not examine this aspect.

Validity of estimate of costs
The authors used charge data that do not represent real opportunity costs. Indirect costs associated with complications were not examined.

Other issues
The main issue is the generalisability of the results to other settings or institutions.

Implications of the study
Future studies assessing the efficacy of image-guided liver biopsies should be conducted.

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Other publications of related interest


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