Cost-effectiveness of screening for recurrent hepatocellular carcinoma after liver transplantation

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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.

CRD summary
This study assessed the cost-effectiveness of a standardised screening programme for patients with recurrent hepatocellular carcinoma after liver transplantation. The authors concluded that screening yielded a high cost per life-year gained. Two years of screening for patients who met the Milan Criteria could be cost-effective, depending on the benefits of treatment. The methods were adequate and they and the results were reported sufficiently. Given the scope of the study, the authors’ conclusions appear to be valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to assess the cost-effectiveness of a standardised screening programme for patients with recurrent hepatocellular carcinoma after liver transplantation.

Interventions
Screening for recurrent hepatocellular carcinoma after liver transplantation consisted of an abdominal computed tomography (CT) scan, alpha-fetoprotein measurement, and chest X-ray, every six months for two years. Screening for all patients, and screening for only those patients whose explant pathology exceeded the Milan Criteria, were compared with no screening.

Location/setting
USA/secondary care.

Methods
Analytical approach:
A state-transition Markov model was used to combine the data from published studies. The time horizon was five years. The authors did not explicitly report the perspective.

Effectiveness data:
The effectiveness data were from sources that were identified by a literature search in MEDLINE. The search was for studies in English, published between 1990 and 2007, and the search terms were reported. The main effectiveness estimate was the mortality after a transplant. These estimates were from published studies.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The measure of benefit was life-years gained and these were discounted at an annual rate of 3%.

Cost data:
The direct costs were those of screening (alpha-fetoprotein, biopsy, bone scan, CT of the abdomen and chest, and chest X-ray), resection, and follow-up after transplantation. All costs were from Medicare fee schedules, diagnosis-related group data, and published estimates. They were reported in 2007 US dollars ($) and discounted at an annual rate of 3%.
Analysis of uncertainty:
One-way and two-way sensitivity analyses were performed to assess the impact of varying each individual variable on the model's results. The results of these analyses were presented in tables.

**Results**
The average life-years gained were 3.537 with no screening, 3.552 with screening for those exceeding the Milan Criteria, and 3.559 with screening for all patients.

The average cost per person was $84,900 with no screening, $86,900 with selective screening, and $89,400 with screening for all patients.

Compared with no screening, the incremental cost-effectiveness ratio was $138,000 per life-year gained for selective screening and $203,000 per life-year gained for screening all patients.

The sensitivity analysis showed that with the most favourable assumptions for two years of screening for those exceeding the Milan Criteria, the incremental cost-effectiveness ratio was $91,000 per life-year gained.

**Authors' conclusions**
The authors concluded that screening for hepatocellular carcinoma recurrence after liver transplantation yielded a high cost per life-year gained. Two years of screening for those who met the Milan Criteria might be cost-effective, depending on the benefits of resection.

**CRD commentary**

- **Interventions:**
The interventions were reported clearly and in detail and they appear to have been appropriate comparators. The study population was described.

- **Effectiveness/benefits:**
The effectiveness data were from sources identified by a literature search. The authors reported the search terms and the years searched, but they did not report the number of reviewers who identified studies, and only one database was searched. Some relevant evidence might have been missed. The measure of benefit appears to have been appropriate, but quality adjustment could have assessed morbidity as well as mortality for these patients.

- **Costs:**
The perspective was not explicitly reported, but the authors appear to have included all those costs incurred by a health care provider. The sources for the costs were given and the price year, time horizon, and discount rate were all clearly reported.

- **Analysis and results:**
All the identified evidence on costs and outcomes was synthesised in a decision-analytic model. Appropriate details of this model were given, including a diagram. The results were adequately reported. One-way sensitivity analyses were conducted to determine which parameters had the greatest impact on the results. A probabilistic sensitivity analysis could have more thoroughly investigated the overall model uncertainty. The authors reported that the main limitation of their analysis was the uncertainty about the effectiveness of treatment for recurrent hepatocellular carcinoma.

- **Concluding remarks:**
The methods were adequate and they and the results were reported sufficiently. Given the scope of the study, the authors' conclusions appear to be valid.

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