Cost-effectiveness of bevacizumab-based therapy versus cisplatin plus pemetrexed for the first-line treatment of advanced non-squamous NSCLC in Korea and Taiwan

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 two first-line treatments for advanced non-squamous non-small cell lung cancer: bevacizumab plus cisplatin and gemcitabine versus cisplatin plus pemetrexed. The authors concluded that the bevacizumab therapy was a cost-effective alternative to the pemetrexed therapy for these patients in both Korea and Taiwan. The methods were valid and explicit, which should ensure that the authors' conclusions are robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study assessed the cost-effectiveness of two first-line treatments for advanced non-squamous non-small cell lung cancer (NSCLC): bevacizumab plus cisplatin and gemcitabine versus cisplatin plus pemetrexed.

Interventions
The bevacizumab therapy consisted of bevacizumab 7.5mg per kg every three weeks, with cisplatin 80mg per m^2 on day one and gemcitabine 1,250mg per m^2 on days one and eight, for six cycles, followed by bevacizumab monotherapy until the disease progressed or toxicity was unacceptable.

The pemetrexed therapy consisted of pemetrexed 50mg per m^2, with cisplatin 75mg per m^2 for six cycles only.

For both treatments, the cycle length was 21 days.

Location/setting
Korea and Taiwan/hospital.

Methods
Analytical approach:
The analysis was based on a Markov model with three health states: progression-free survival, progression, and death. A lifetime horizon was considered. The authors stated that it was carried out from the perspective of the health care payer.

Effectiveness data:
The clinical data were from two published randomised controlled trials (RCTs). Each provided information on the disease progression rates for the two treatments, with cisplatin and gemcitabine as the common comparator. The data were pooled in an indirect comparison. Various parametric functions were tested, and hazard ratios were calculated using a log-logistic distribution. Data from the subgroups of Asian patients in each clinical trial were analysed. Overall survival and progression-free survival were the key clinical inputs.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
Life-years were the summary benefit measure and they were discounted at an annual rate of 5% for Korea and 3% for Taiwan.
Cost data:
The economic analysis included the costs of drug acquisition and administration, supportive care, and the management of adverse events. These costs were from official tariffs in each country, plus a published study of supportive care in Korea. The rates of events and drug consumption were based on data from the two RCTs. The costs were expressed in Korean won and Taiwan dollars, and converted into US dollars ($), using the official exchange rate. The annual discount rate was 5% for Korea and 3% for Taiwan.

Analysis of uncertainty:
One-way sensitivity analyses were carried out on: the post-progression costs, body weight, and the cost of managing adverse events. Ranges of ±10% were considered. A first-order probabilistic analysis was carried out, using 1,000 iterations.

Results
In Korea, bevacizumab therapy produced a gain of 1.10 life-years, at an additional cost of $33,322, compared with pemetrexed therapy. The incremental cost per life-year gained with bevacizumab over pemtrexed was $30,318. In the probabilistic analysis, the incremental cost per life-year gained was $31,067.

In Taiwan, bevacizumab therapy produced a gain of 1.19 life-years, at an additional cost of $64,541, compared with pemetrexed therapy. The incremental cost per life-year gained with bevacizumab over pemtrexed was $54,317. In the probabilistic analysis, the incremental cost per life-year gained was $55,087.

In both countries, the deterministic sensitivity analysis showed that the base-case results were robust.

Authors' conclusions
The authors concluded that bevacizumab therapy was a cost-effective alternative to pemetrexed therapy for patients with advanced NSCLC in both Korea and Taiwan.

CRD commentary
Interventions:
The selection of the comparators appears to have been appropriate and generalisable to other health care settings. A clear description of the dosages was provided.

Effectiveness/benefits:
The clinical data were from two large clinical trials. No head-to-head trial of the two regimens was found and an indirect comparison was made. This could limit the analysis, but the authors addressed the issue by selecting very similar subgroups from the two trials. Sensitivity analyses were conducted for the key model parameters. Life-years saved was a valid benefit measure and it allows comparisons with other disease interventions. The authors stated that quality-adjusted life-years were not used as life-years were considered to be more appropriate for these cancer patients.

Costs:
The categories of costs reflected the perspective of the health care system. The unit costs and resource use were reported for the drug regimens, while other costs were reported as combined totals. Most of the data were from Taiwanese or Korean sources, which were likely to be relevant and appropriate. The costs were varied in the probabilistic analysis. Discount rates were applied for each country, but the price year was not explicitly reported. The authors stated that fixed costs were used for adverse events at the beginning of the model, for simplicity.

Analysis and results:
The results were clearly presented for both countries. An appropriate incremental approach was used to synthesise the costs and benefits of the two treatments. Both probabilistic and deterministic sensitivity analyses were carried out to investigate the uncertainty, and the findings were clearly reported. It appears that only a first-order probabilistic analysis was conducted. The authors discussed the results of other economic evaluations that had similar conclusions. These results appear to have been specific to the Asian population, in the two countries analysed, and cannot be transferred to other settings.
Concluding remarks:
The methods were valid and explicit, which should ensure that the authors’ conclusions are robust.

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