Cost-effectiveness evaluation of sunitinib as first-line targeted therapy for metastatic renal cell carcinoma in Spain


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 examined the cost-effectiveness of sunitinib as a first-line treatment for patients with metastatic renal cell carcinoma. The authors concluded that sunitinib was cost-effective, compared with other first-line therapies, from the Spanish health care perspective. The cost-effectiveness framework was conventional and the data sources and key methods were clearly reported. The authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
This study examined the cost-effectiveness of sunitinib as a first-line treatment for patients with metastatic renal cell carcinoma.

Interventions
The three first-line treatments were sunitinib, sorafenib, and bevacizumab plus interferon-alpha. Sunitinib was given at a dose of 50mg per day, sorafenib at 400mg twice daily, and bevacizumab at 10mg per kg every two weeks.

Location/setting
Spain/hospital.

Methods
Analytical approach:
The analysis was based on a Markov simulation, with a 10-year time horizon and a hypothetical cohort of patients with metastatic renal cell carcinoma. The authors stated that they took the perspective of the third-party payer.

Effectiveness data:
Four randomised controlled trials (RCTs) were used to produce all the key clinical inputs, such as drug efficacy and safety. There were no head-to-head clinical trials, so indirect comparisons were carried out using interferon-alpha as the common comparator. For sunitinib, a phase III pivotal trial of 750 patients provided the overall survival and progression-free survival. For sorafenib, the overall survival was from a phase III trial (comparing it with placebo) and progression-free survival was from a phase II trial. The efficacy of bevacizumab plus interferon was from a phase III trial. The short follow-up in these trials was extrapolated to 10 years using a Weibull distribution on patient-level data. The hazard ratio for overall survival for each treatment compared with interferon was the key model input.

Monetary benefit and utility valuations:
Most of the utility estimates used quality-of-life data from the sunitinib trial, which used the European Quality of life (EQ-5D) questionnaire. Other data were from published sources or expert opinion.

Measure of benefit:
The summary benefit measures were progression-free life-years (PFLYs), life-years, and quality-adjusted life-years (QALYs). A 3% annual discount rate was applied.

Cost data:
The economic analysis included the costs of the main drugs, second-line therapies, hospitalisations, specialist and primary care visits, laboratory tests, other drugs, palliative procedures, and adverse event management. The drug costs were based on official price lists, while other costs were from a Spanish database of health care costs. The patterns of resource consumption were estimated by a panel of five oncologists from Spain. All costs were in Euros (EUR) and were discounted at an annual rate of 3%. The price year was 2008.

Analysis of uncertainty:
One-way sensitivity analyses were carried out to examine the influence of inputs on the model outcomes. A probabilistic sensitivity analysis was performed, using a second-order Monte Carlo simulation, and cost-effectiveness acceptability curves were generated.

Results
The expected total costs were EUR 118,417 for sunitinib, EUR 119,541 for sorafenib, and EUR 141,634 for bevacizumab plus interferon. The PFLYs were 1.35 for sunitinib, 0.83 for sorafenib, and 1.15 for bevacizumab, and the QALYs were 1.87 for sunitinib, 1.70 for sorafenib, and 1.71 for bevacizumab. Sunitinib was dominant as it was more effective and less expensive than either comparator.

The probabilistic analysis showed that at a willingness-to-pay threshold of EUR 50,000 per QALY, sunitinib was cost-effective in 75% of simulations. The most influential inputs were the drug costs, utility values, and hazard ratios for both overall survival and progression-free survival, but only extreme changes affected the conclusions.

Authors’ conclusions
The authors concluded that sunitinib was cost-effective, compared with other first-line therapies, from the Spanish health care perspective.

CRD commentary
Interventions:
The selection of the comparators was appropriate as it included the available treatments for metastatic renal cell carcinoma. These options are likely to be generalisable to other health care settings.

Effectiveness/benefits:
The clinical data were mainly from RCTs and these were described. Each of them appears to have had high internal validity, but no head-to-head comparison was available, and an indirect comparison was necessary, using interferon as the common comparator. The authors stated that the patient populations were similar at baseline. The hazard ratio for overall survival with sorafenib was based on a comparison with placebo instead of interferon and this might have overestimated its benefits, as the authors acknowledged. The long-term analysis was based on appropriate survival curves. Extensive sensitivity analysis was performed on the clinical inputs. Several benefit measures were used to assess the impact of the disease on the patients’ health. Life-years and QALYs allow cross-disease comparisons. The utility weights were obtained using a validated questionnaire completed by the patients in the sunitinib trial.

Costs:
The economic analysis was consistent with the perspective stated. Limited information on resource quantities and unit costs was provided. For each cost category, the total cost per cycle was reported. The sources for the unit costs appear to have been appropriate. The patterns of resource consumption were based on expert opinion and reflected the Spanish health care system. The price year was reported, allowing reflation exercises. The impact of variations in the cost estimates was assessed in the sensitivity analyses.

Analysis and results:
The results were clearly presented. Cost-effectiveness and cost-utility ratios were not calculated as sunitinib was dominant. Valid approaches were used to assess uncertainty and the findings were clearly reported and discussed. The authors justified their choice of a 10-year horizon, as patients with metastatic renal cell carcinoma have a limited lifespan, based on published survival data. They reported some findings from other economic evaluations that generally found sunitinib to be cost-effective, but with a less favourable ratio than in this analysis. These results appear to be transferable to other settings with similar relative prices and clinical patterns.
Concluding remarks:
The cost-effectiveness framework was conventional and the data sources and key methods were clearly reported. The authors’ conclusions appear to be robust.

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