

Cost-effectiveness of immunotherapy in the treatment of advanced clear-cell renal carcinoma

Summary

Objective: To evaluate the effectiveness and cost-effectiveness of using nivolumab with ipilimumab (NIV+IPI) and pembrolizumab with axitinib (PEM+AXI) compared to sunitinib in the first-line treatment of advanced clear-cell renal carcinoma (ccRCC) in Estonia.

Methods: To meet the objective, an overview of the latest international treatment guidelines for renal cell carcinoma and the evidence on the effectiveness and cost-effectiveness of compared treatment regimens were composed. Cost-effectiveness and budget impact analysis were based on Estonian data and calculated compared to sunitinib in two prognostic groups: all patients with advanced ccRCC and patients belonging to the intermediate- or poor-risk population. Cost-effectiveness analysis with a time horizon of 10 years was performed using a partitioned survival model, characterized by the distribution of patients between three health states: progression-free, progressed and dead. The transitions between health states were directly related to progression-free and overall survival curves derived from the clinical trials of treatment regimens analyzed. Probabilities of treatment discontinuation and second-line treatment were also based on clinical trial data. Quality of life estimates were derived from published literature. Drug and treatment costs were calculated using Estonian Health Insurance Fund (EHIF) data, whose perspective the analysis used. Costs and effects were discounted using an annual discount rate of 5%. Results were presented in terms of costs, life years, quality-adjusted life years (QALY) and incremental cost-effectiveness ratios (ICER). Additionally, 5-year budget impact analysis from the healthcare payer perspective was carried out.

Results: In the base case scenario the analysis showed that compared to sunitinib treatment with NIV+IPI would enable to gain 0.58 QALYs per patient with advanced ccRCC and 0.72 QALYs per patient belonging to the intermediate- or poor-risk group. Expected QALY gains of using PEM+AXI were 0.42 and 0.62 QALYs per patient, respectively. The additional cost compared to sunitinib treatment was estimated at €78,660–€93,895 per patient using NIV+IPI and at €66,287–€67,637 per patient using PEM+AXI. In patients receiving NIV+IPI, the ICERs were €135,557 per QALY gained in all advanced ccRCC patients and €129,573 per QALY gained in intermediate- or poor risk group patients. The respective ICERs of using PEM+AXI were €150,007 and €108,549 per QALY gained. In sensitivity analysis, the results were most influenced by drug prices, the choice of time horizon and the duration of drug use. The 5-year budget impact analysis showed that if the annual number of patients starting first-line treatment would remain constant, the total additional cost of treatment would be about €28 million for both drug combinations in the intermediate- or poor-risk population. If all advanced renal-cell carcinoma patients would receive the drug combinations as first-line treatment, the budget impact would be between €36 and €43 million.

Conclusions: Using nivolumab in combination with ipilimumab or pembrolizumab in combination with axitinib would result in more quality-adjusted life-years at a substantially higher cost when compared to standard sunitinib treatment.

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