Cost-Effectiveness Analysis of Axitinib in the Treatment of Metastatic Renal Cell Carcinoma – Clinical Data vs RWE

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Objectives

The aim was to compare costs and effectiveness of axitinib against everolimus in the treatment of metastatic renal cell carcinoma (mRCC) in sunitinib refractory patients from the perspective of the public healthcare payer in the Czech Republic.

Methods

Health-economic model

A Markov model was developed to estimate the incremental cost per incremental quality-adjusted life year (QALY) gained of axitinib compared to everolimus in the treatment of mRCC in sunitinib refractory patients over a 10-year time horizon (28-days cycle).

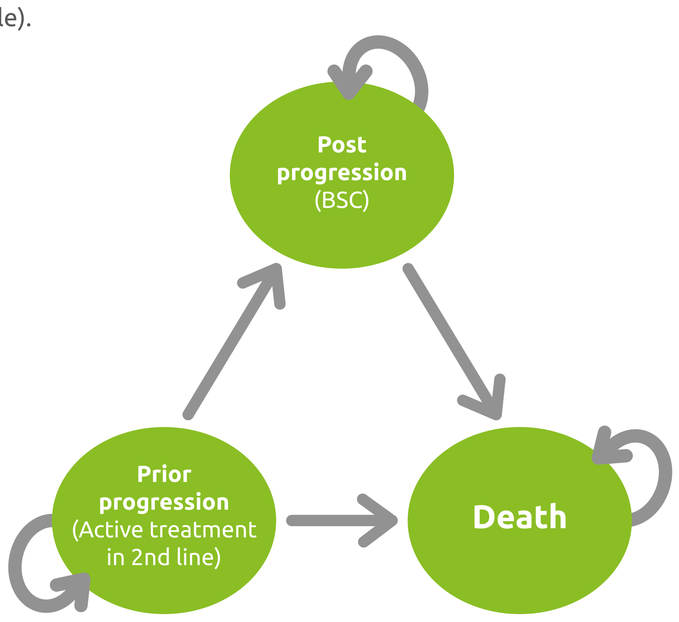

Figure 1: Model structure

Efficacy

Progression-free survival (PFS) and overall survival (OS) were selected as basic parameters of effectiveness. PFS and OS were calculated using parametric survival distributions estimated from Kaplan-Meier curves.

As no head-to-head trials comparing axitinib and everolimus in treatment of mRCC in sunitinib refractory patients were found, three different approaches are shown: a naive approach comparing data from AXIS (1; 2) and RECORD trials (3; 4), matching-adjusted approach comparing real world data for axitinib from Czech registry (5) and clinical trial data for everolimus (RECORD trial (3; 4)) and Simulated Treatment Comparison (STC) of AXIS and RECORD trials. Statistical distributions were chosen according to the Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC) and visual expert assessment.

Naïve comparison of AXIS and RECORD

For both arms, axitinib and everolimus, Weibull distribution for PFS and OS curve was chosen with hazard ratios (HR) of axitinib vs everolimus 0.96 (SD = 0.269, 95% CI: 0.571 – 1.627) and 0.98 (SD = 0.196, CI:0.67 – 1.44).

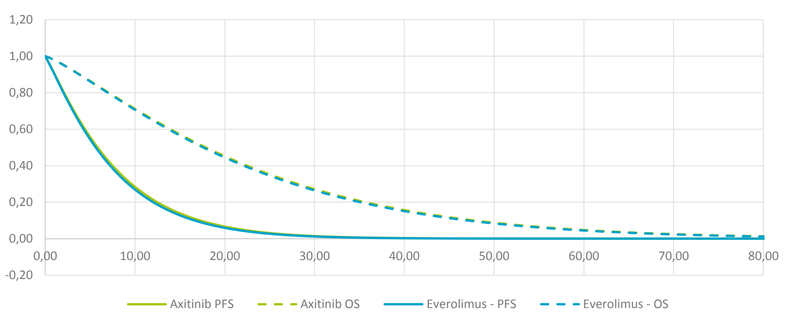

Figure 2: Naive Approach – PFS and OS curves

Matching-adjusted approach

For PFS curve of axitinib the Log-normal distribution was chosen. For OS curve of axitinib and PFS and OS curves of everolimus, Weibull distribution was chosen.

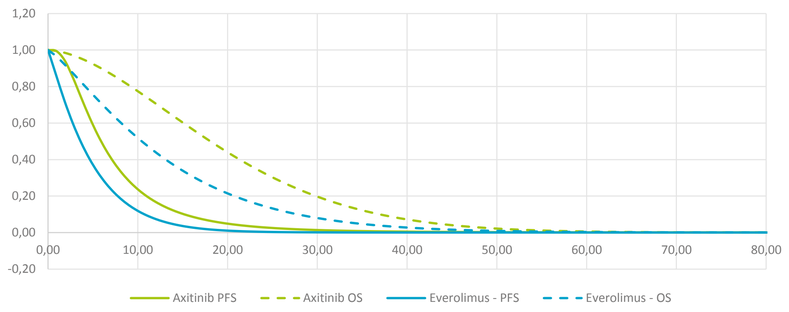

Figure 3: Matching-adjusted Approach – PFS and OS curves

Simulated treatment comparison

For both arms, axitinib and everolimus, Weibull distribution for PFS and OS curve was chosen.

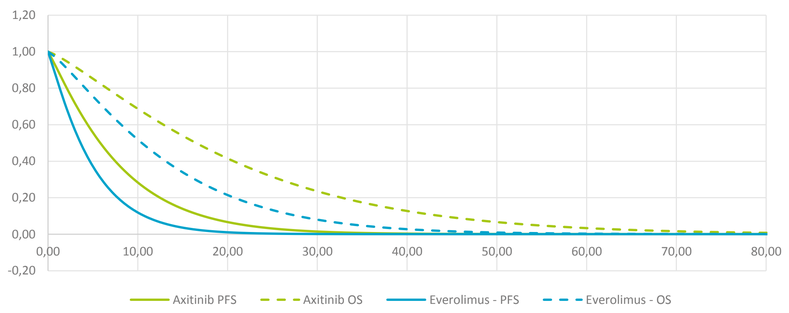

Figure 4: STC Approach – PFS and OS curves

Quality of life

Utilities from AXIS trial (EQ-5D) were used for all scenarios (2).

Mean baseline utility	0.7320
Progressive disease, BSC	0.6101

Costs

Among relevant costs (reflecting payer's perspective) drug costs and monitoring were considered. Discount rate was set to 3 %.

	Costs	Reference
Drug costs per cycle		
Axitinib	2,914.61 €	External price references 02/2015
Everolimus	3,043.59 €	(1)
Monitoring costs per cycle*		
Prior progression	70.17 €	(1; 2; 3)
Post progression	48.16 €	(1; 2; 3)

** Medical oncology visit, radiation visit, laboratory test, CT scan, EKG, MRI…*

Results

In the naive comparison scenario axitinib is dominant compared to everolimus as it is less costly and generates more QALY. When using Czech RWD and RECORD trial the incremental cost-effectiveness ratio (ICER) of axitinib reached 24,089.71 EUR per QALY gained. The last scenario (STC of AXIS and RECORD) the ICER was 23,000.43 EUR. All of the three scenarios scored way under the level of Czech willingness to pay (WTP) 43,584.06 EUR.

Approach	Incremental costs	Incremental QALYs	ICER/QALY
Naïve	-150.69 €	0.02	Axitinib is dominant*
Matching-adjusted approach	8,672.30 €	0.36	24,089.71 €
STC	8,740.16 €	0.38	23,000.43 €

** Note that HRs are not significant and because of population differences in AXIS and RECORD trials, STC is better approach to compare these treatments.*

Conclusion

Axitinib proved efficacy in the real clinical practice in the Czech Republic. The cost-effectiveness analysis also showed that axitinib can be considered a cost-effective treatment for mRCC sunitinib refractory patients when compared to everolimus.

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Keywords

Cost-utility Analysis, renal cell carcinoma, axitinib, everolimus, Czech Republic

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