Cost-Effectiveness of Tivozanib in Advanced Renal Cell Carcinoma in the US

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Background

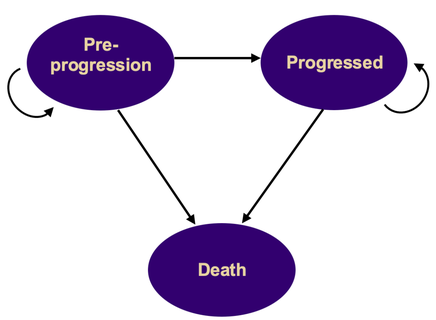
- Advanced renal cell carcinoma (aRCC) is the progressed form of the most common type of urogenital cancer[1]
- In the United States (US), there are ~63,000 new cases and ~14,000 deaths due to RCC annually[1]
- Annual economic burden of aRCC in the US ranges from $0.60 to $5.19 billion annually
- Despite the increasing treatment options for aRCC in recent years, many new drugs' cost-effectiveness and budgetary impact remain unexplored[3]
- In TIVO-3 trial, tivozanib outperformed sorafenib in terms of progression-free survival, but its higher cost leaves its cost-effectiveness uncertain[4]

Objective

- To evaluate the cost-effectiveness of tivozanib and sorafenib in patients diagnosed with relapsed or refractory aRCC from a US commercial payer perspective using a three-state partitioned survival model

Methods

Figure 1. Three-state Partitioned Survival Model



Methods

Table 1. Model Details

Model Structure	
Cycle Length	1 month
Time Horizon	Life-time
Perspective	US commercial payer
Correction	Half cycle
Input Parameters	
Health State Occupancy	Survival data was derived from the Kaplan Meier curves from TIVO-3
Utilities+ (Monthly)	Pre-progression: 0.075 Progressed: 0.068
Disutilities	None. No drug-related adverse event ≥ grade 3 exceeded the 5% incidence threshold
Costs*+ (Monthly)	Tivozanib: $36,800 Sorafenib: $25,300
Discount (Monthly)	Cost: 0.25% Outcomes: 0.25%

*: adjusted to 2024 values, +: applied 20% variation

Population

- Patients with a diagnosis of relapsed or refractory aRCC and failed 2 or more systemic regimens other than sorafenib or tivozanib
- Mean age: 63 years old

Assumptions

- Patients remained on their drug regimen for their remaining life span
- There were no discontinuations or therapy switches

Results

Table 2. Base Case Deterministic Results

	Tivozanib	Sorafenib	Incremental
Cost	$483,325	$375,781	$107,544
Life-Years	25.80	29.24	-3.44
QALYs	1.82	2.05	-0.23
ICER			**Dominated**

Figure 2. One-Way Sensitivity Analysis

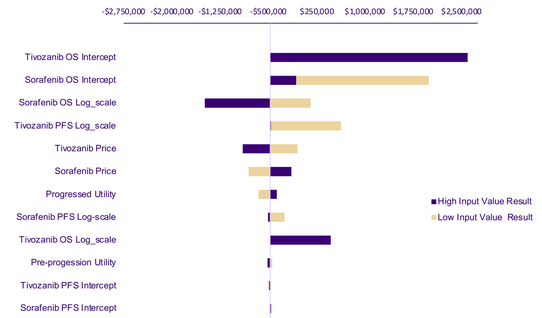
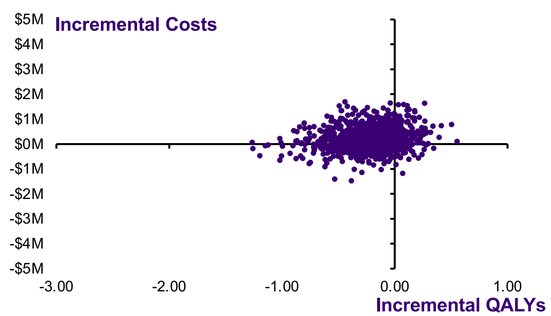


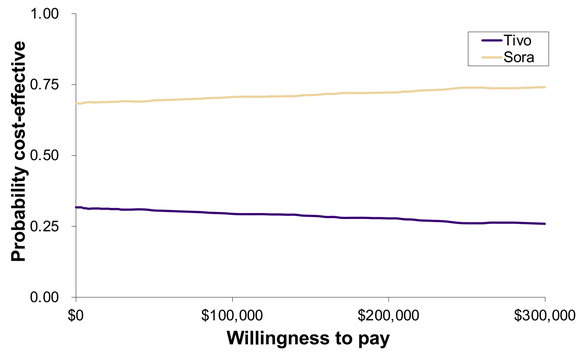
Figure 3. Probabilistic Sensitivity Analysis



- Tivozanib was less effective and more costly 55% of the time, while being less effective and costly 27% of the time compared to sorafenib

Results

Figure 4. Cost-effectiveness Acceptability Curve



- Sorafenib was more likely to be cost-effective than tivozanib by a large margin (70% vs. 30%) between the willingness-to-pay threshold of $0 to $300,000

Discussion

- At the willingness-to-pay threshold of $150,000/QALY, tivozanib was dominated by sorafenib

Limitations

- Model assumed that patients would remain on the therapy throughout their remaining lifespan
- Model did not incorporate costly serious adverse events, such as pulmonary embolism and stroke
- The model did not factor in variations in adherence resulting from different administration frequencies between the two therapies

References

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